Figure 1. Cloning of BPIV3 strain Ka or strain SF coding region into HPIV3 context

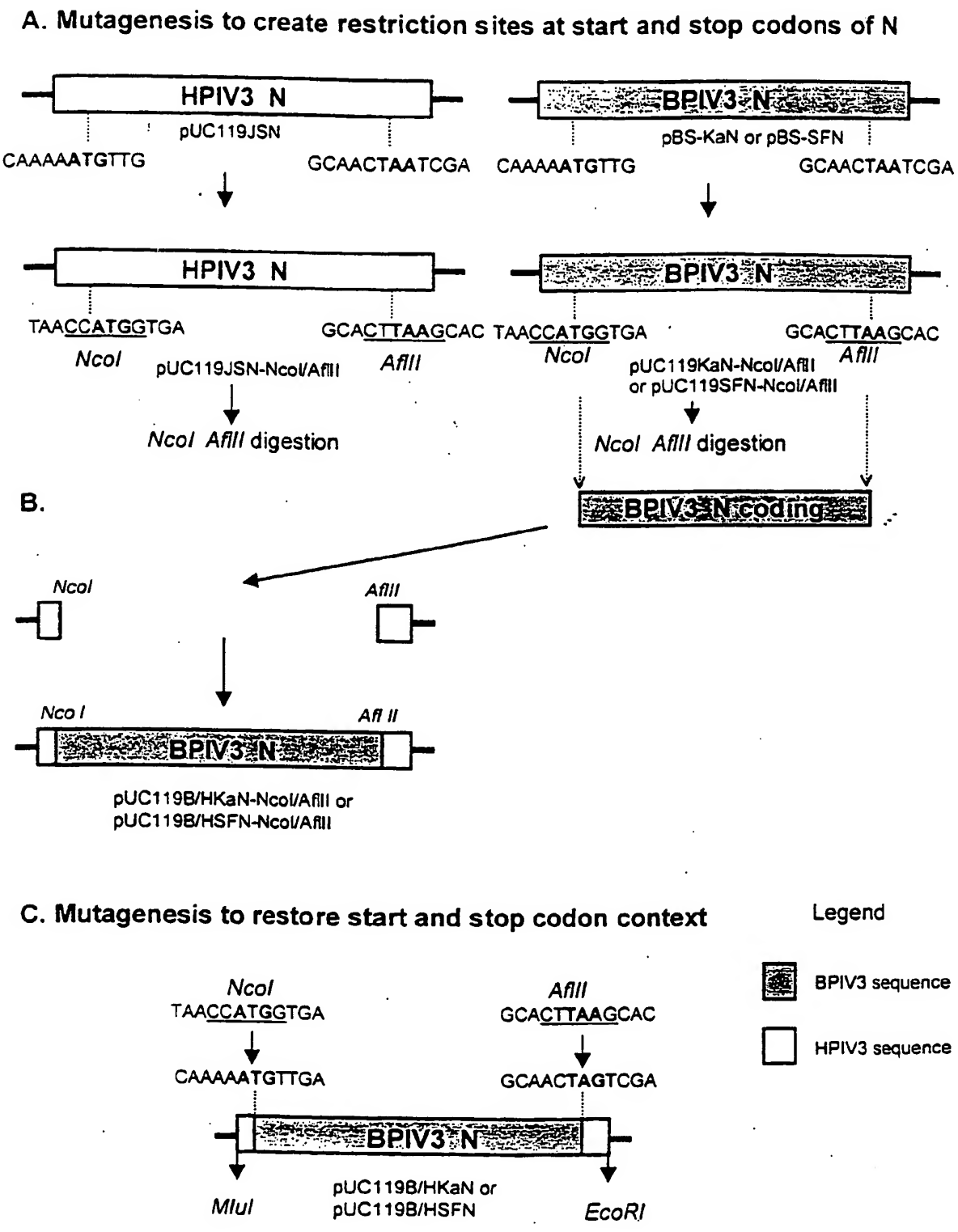


Figure 2. Cloning of BPIV3 N coding region into HPIV3 antigenomic cDNA

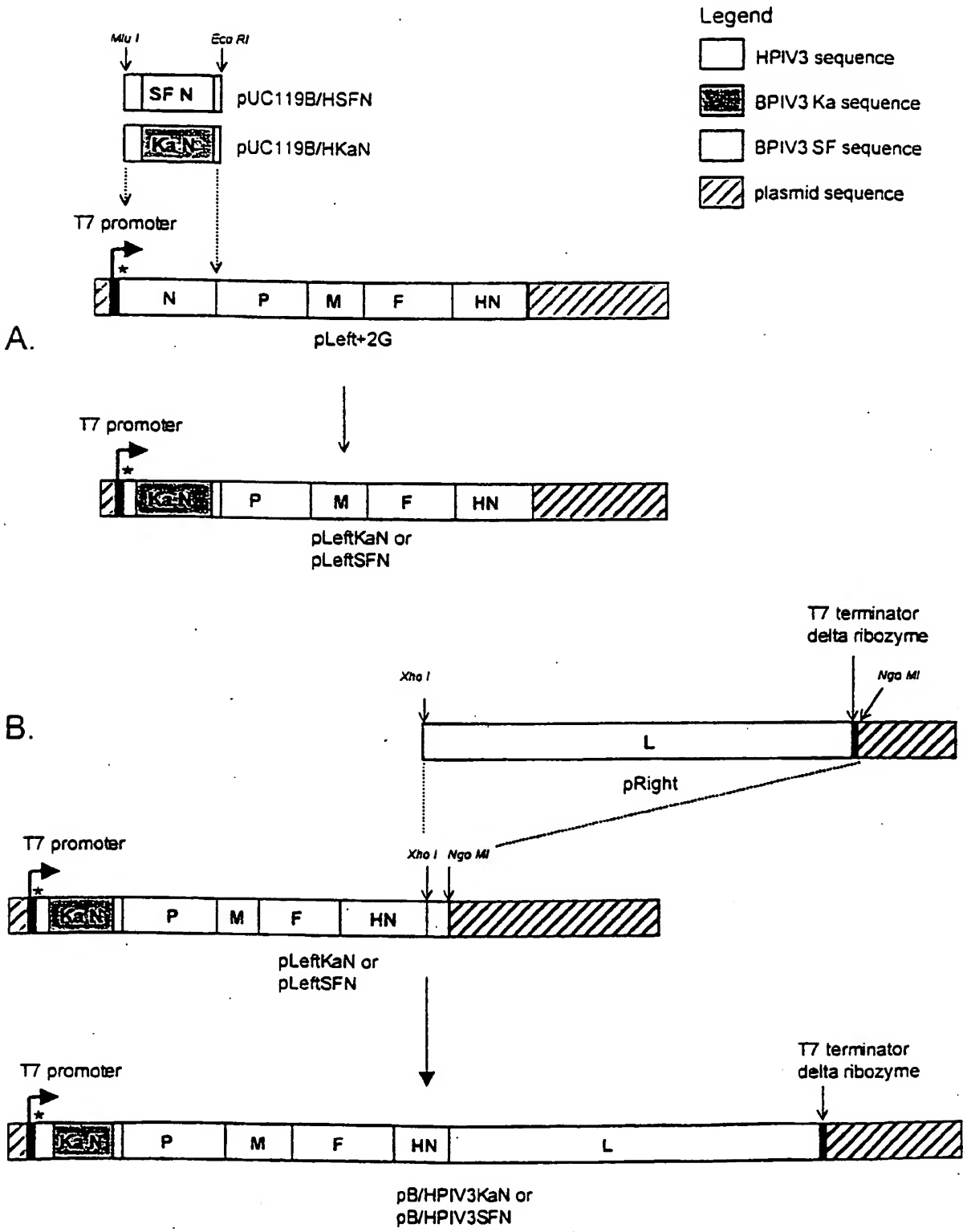


Figure 3. Nucleotide sequences of HPIV3, BPIV3 and chimeric viruses around the start (A) and stop (B) codons of the N gene

A.

rJS	GGAACTCTATAATTTCAAAAATGTTGAGCCTATTTGATAC
cKa	GGAACTCTATAATTTCAAAAATGTTGAGTCTATTCGACAC
cSF	GGAACTCTATAATTTCAAAAATGTTGAGTCTATTCGACAC
Ka	GAAATCCTAAGACTGTAATCATGTTGAGTCTATTCGACAC
SF	GAAATCCTAAGACTGTAATCATGTTGAGTCTATTCGACAC

B.

rJS	TTAACGCATTTGGAAGCAACTAATCGAATCAACATTTTAA
cKa	TCAGTGCATTCGGAAGCAACTAGTCGAATCAACATTTTAA
cSF	TCAGTGCATTCGGAAGCAACTAGTCGAATCAACATTTTAA
Ka	TCAGTGCATTCGGAAGCAACTAGTCACAAAGAGATGACCA
SF	TCAGTGCATTCGGAAGCAACTAGTCACAAAGAGATGACCA

Figure 4. Confirmation of identity of potential BPIV3/HPIV3 chimeras by TaqI digestion

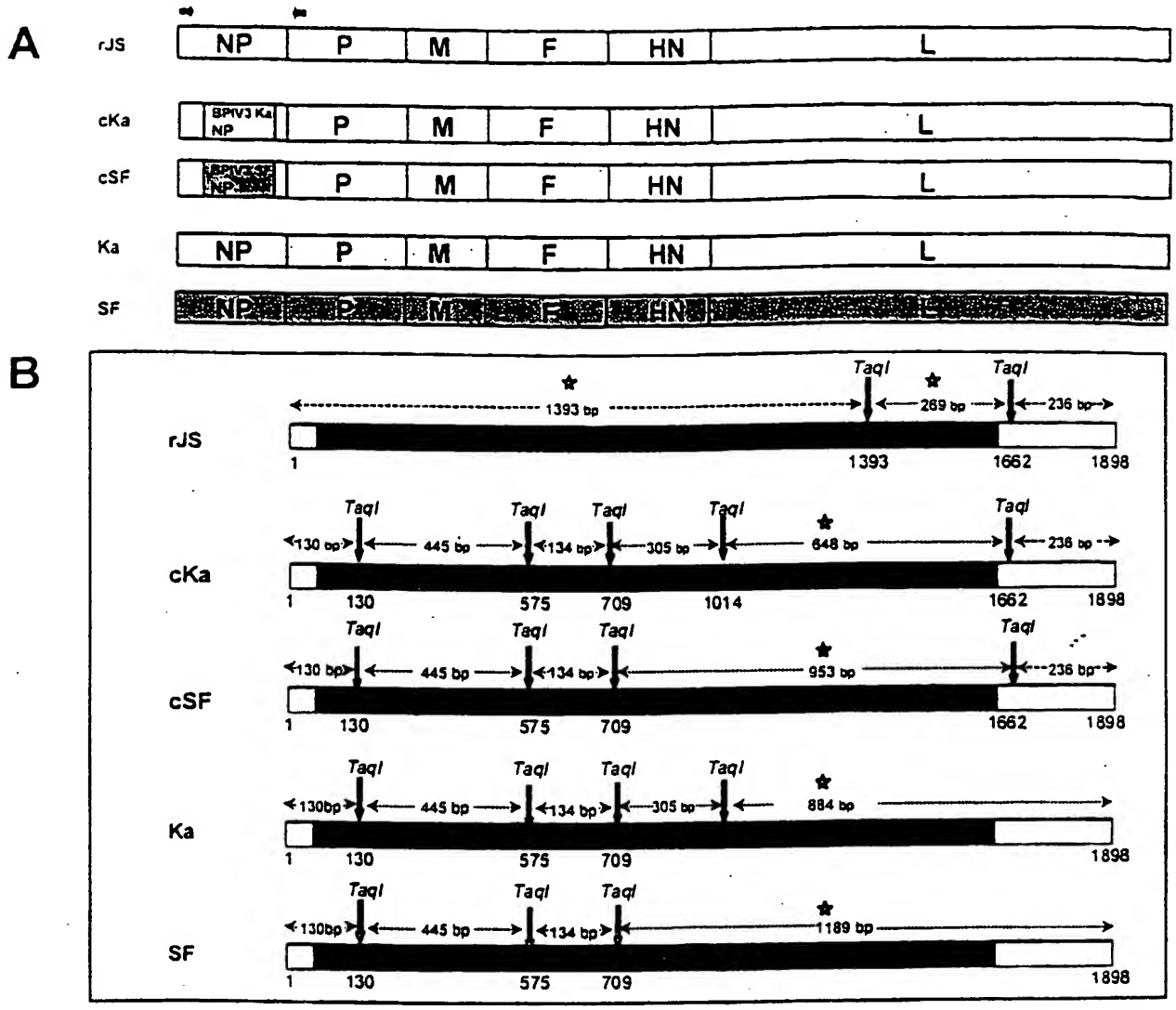
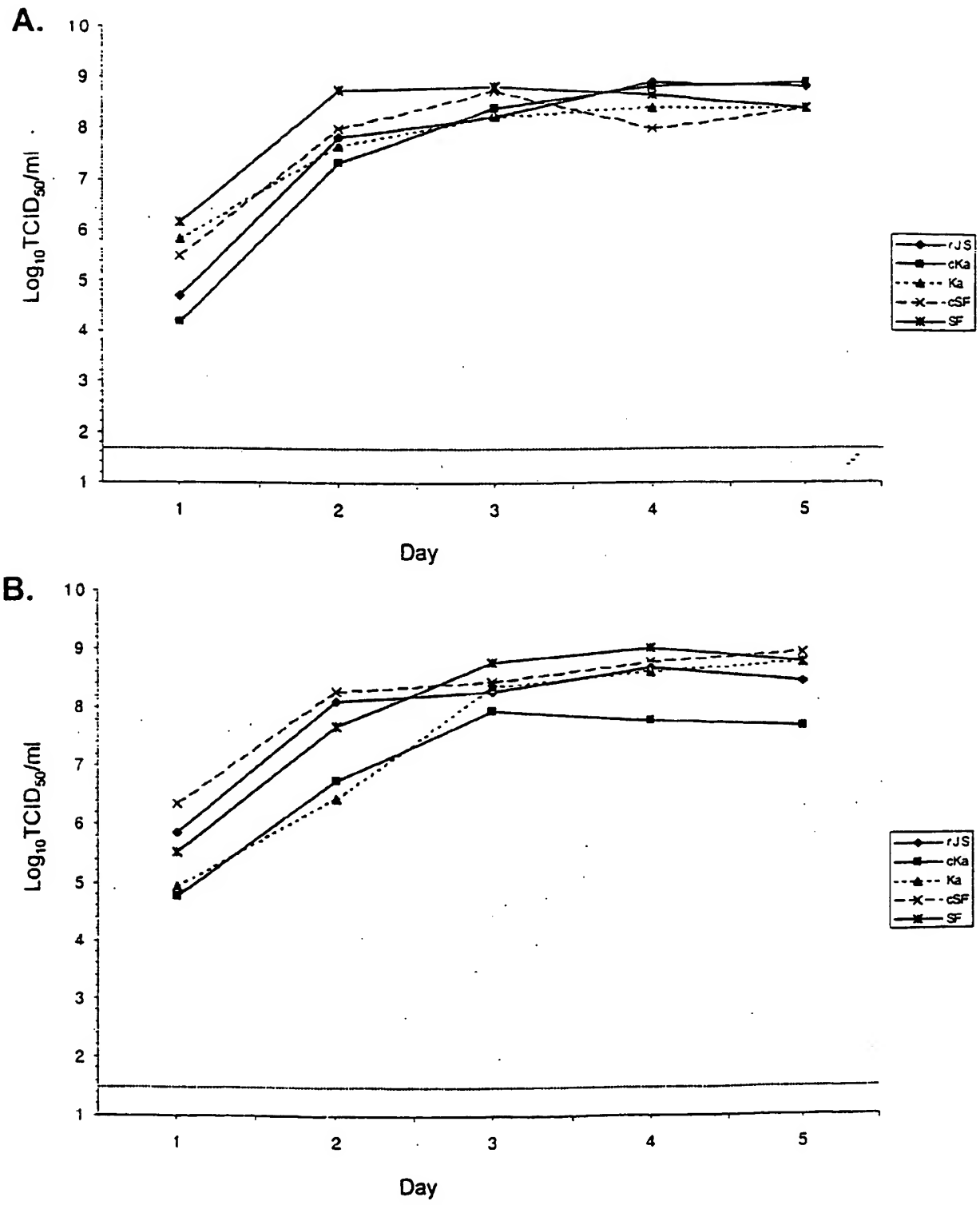


Figure 5. Multicycle growth curves in MDBK (A) or LLC-MK2 (B) cells



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ACCAAACAAG AGAAGAGACT TGCTTGGGAA TATTAATTCA AATAAAAATT      50
AACTTAGGAT TAAAGAACTT TACCGAAAGG TAAGGGGAAA GAAATCCTAA     100
GACTGTAATC ATGTTGAGTC TATTCGACAC ATTCAGTGCG CGTAGGCAGG     150
AGAACATAAC GAAATCAGCT GGTGGGGCTG TTATTCCCGG GCAAAAAAAC     200
ACTGTGTCTA TATTTGCTCT TGGACCATCA ATAACAGATG ACAATGATAA     250
AATGACATTG GCTCTTCTCT TTTTGTCTCA TTCTTTAGAC AATGAAAAGC     300
AGCATGCGCA AAGAGCTGGA TTTTTAGTTT CTCTGTTATC AATGGCTTAT     350
GCCAACCCAG AATTATATTT AACATCAAAT GGTAGTAATG CAGATGTTAA     400
ATATGTTATC TACATGATAG AGAAAGACCC AGGAAGACAG AAATATGGTG     450
GGTTTGTCGT CAAGACTAGA GAGATGGTTT ATGAAAAGAC AACTGATTGG     500
ATGTTCGGGA GTGATCTTGA GTATGATCAA GACAATATGT TGCAAAATGG     550
TAGAAGCACT TCTACAATCG AGGATCTTGT TCATACTTTT GGATATCCAT     600
CGTGTCTTGG AGCCCTTATA ATCCAAGTTT GGATAATACT TGTTAAGGCT     650
ATAACCAGTA TATCAGGATT GAGGAAAGGA TTCTTTACTC GGTTAGAAGC     700
ATTTCGACAA GATGGAACAG TTAAATCCAG TCTAGTGTTG AGCGGTGATG     750
CAGTAGAACA AATTGGATCA ATTATGAGGT CCCAACAGAG CTTGGTAACA     800
CTCATGGTTG AAACACTGAT AACAATGAAC ACAGGCAGGA ATGATCTGAC     850
AACAATAGAA AAGAATATAC AGATTGTAGG AAACTACATC AGAGATGCAG     900
GTCTTGCTTC ATTTTTCAAC ACAATCAGAT ATGGCATTGA GACTAGAATG     950
GCAGCTCTAA CTCTGTCTAC CCTTAGACCG GATATCAACA GACTCAAGGC    1000
ACTGATCGAG TTATATCTAT CAAAGGGGCC ACGTGCTCCT TTTATATGCA    1050
TTTTGAGAGA TCCCGTGCAT GGTGAGTTTG CACCAGGCAA CTATCCTGCC    1100
CTCTGGAGTT ATGCGATGGG TGTAGCAGTT GTACAAAACA AGGCCATGCA    1150
ACAGTATGTA ACAGGAAGGT CTTATCTGGA TATTGAAATG TTCCAACTTG    1200
GTCAAGCAGT GGCACGTGAT GCCGAGTCGC AGATGAGTTC AATATTAGAG    1250
GATGAACTGG GGGTCACACA AGAAGCCAAG CAAAGCTTGA AGAAACACAT    1300
GAAGAACATC AGCAGTTCAG ATACAACCTT TCATAAGCCT ACAGGGGGAT    1350
CAGCCATAGA AATGGCGATA GATGAAGAAG CAGGGCAGCC TGAATCCAGA    1400
GGAGATCAGG ATCAAGGAGA TGAGCCTCGG TCATCCATAG TTCCTTATGC    1450
ATGGGCAGAC GAAACCGGGA ATGACAATCA AACTGAATCA ACTACAGAAA    1500
TTGACAGCAT CAAAACTGAA CAAAGAAACA TCAGAGACAG GCTGAACAAA    1550
AGACTCAACG AGAAAAGGAA ACAGAGTGAC CCGAGATCAA CTGACATCAC    1600
AAACAACACA AATCAAACTG AAATAGATGA TTTGTTCAGT GCATTCGGAA    1650
GCAACTAGTC ACAAAGAGAT GACCACTATC ACCAGCAACA AGTAAGAAAA    1700
ACTTAGGATT AATGGAAATT ATCCAATCCA GAGACGGAAG GACAAATCCA    1750
GAATCCAACC ACAACTCAAT CAACCAAAGA TTCATGGAAG ACAATGTTCA    1800
AAACAATCAA ATCATGGATT CTTGGGAAGA GGGATCAGGA GATAAATCAT    1850
CTGACATCTC ATCGGCCCTC GACATCATTG AATTCATACT CAGCACCGAC    1900
TCCCAAGAGA ACACGGCAGA CAGCAATGAA ATCAACACAG GAACCACAAG    1950
ACTTAGCACG ACAATCTACC AACCTGAATC CAAAACAACA GAAACAAGCA    2000
AGGAAAATAG TGGACCAGCT AACAAAAATC GACAGTTTGG GGCATCACAC    2050
GAACGTGCCA CAGAGACAAA AGATAGAAAT GTTAATCAGG AGACTGTACA    2100
GGGAGGATAT AGGAGAGGAA GCAGCCCAGA TAGTAGAACT GAGACTATGG    2150
TCACTCGAAG AATCTCCAGA AGCAGCCCAG ATCCTAACAA TGGAACCCAA    2200
ATCCAGGAAG ATATTGATTA CAATGAAGTT GGAGAGATGG ATAAGGACTC    2250
TACTAAGAGG GAAATGCGAC AATTTAAAGA TGTTCCAGTC AAGGTATCAG    2300
GAAGTGATGC CATTCCTCCA ACAAAACAAG ATGGAGACGG TGATGATGGA    2350
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FIG. 6A

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AGAGGCCTGG AATCTATCAG TACATTTGAT TCAGGATATA CCAGTATAGT    2400
GACTGCCGCA ACACTAGATG ACGAAGAAGA ACTCCTTATG AAGAACAACA    2450
GGCCAAGAAA GTATCAATCA ACACCCCAGA ACAGTGACAA GGGAATTAAA    2500
AAAGGGGTTG GAAGGCCAAA AGACACAGAC AAACAATCAT CAATATTGGA    2550
CTACGAACTC AACTTCAAAG GATCGAAGAA GAGCCAGAAA ATCCTCAAAG    2600
CCAGCACGAA TACAGGAGAA CCAACAAGAC CACAGAATGG ATCCCAGGGG    2650
AAGAGAATCA CATCCTGGAA CATCCTCAAC AGCGAGAGCG GCAATCGAAC    2700
AGAATCAACA AACCAAACCC ATCAGACATC AACCTCGGGA CAGAACCACA    2750
CAATGGGACC AAGCAGAACA ACCTCCGAAC CAAGGATCAA GACACAAAAG    2800
ACGGATGGAA AGGAAAGAGA GGACACAGAA GAGAGCACTC GATTTACAGA    2850
AAGGGCGATT ACATTATTAC AGAATCTTGG TGTAATCCAA TCTGCAGCAA    2900
AATTAGACCT ATACCAAGAC AAGAGAGTTG TGTGTGTGGC GAATGTCCTA    2950
AACAATGCAG ATACTGCATC AAAGATAGAC TTCCTAGCAG GTTTGATGAT    3000
AGGAGTGTCA ATGGATCATG ATACCAAATT AAATCAGATT CAGAACGAGA    3050
TATTAAGTTT GAAAACTGAT CTTAAAAAGA TGGATGAATC ACATAGAAGA    3100
CTAATTGAGA ATCAAAAAGA ACAATTATCA CTGATCACAT CATTAATCTC    3150
AAATCTTAAA ATTATGACAG AGAGAGGAGG GAAGAAGGAC CAACCAGAAC    3200
CTAGCGGGAG GACATCCATG ATCAAGACAA AAGCAAAAGA AGAGAAAATA    3250
AAGAAAGTCA GGTTTGACCC TCTTATGGAA ACACAGGGCA TCGAGAAAAA    3300
CATCCCTGAC CTCTATAGAT CAATAGAGAA AACACCAGAA AACGACACAC    3350
AGATCAAATC AGAAATAAAC AGATTGAATG ATGAATCCAA TGCCACTAGA    3400
TTAGTACCTA GAAGAATAAG CAGTACAATG AGATCATTAA TAATAATCAT    3450
TAACAACAGC AATTTATCAT CAAAAGCAAA GCAATCATAC ATCAACGAAC    3500
TCAAGCTCTG CAAGAGTGAC GAGGAAGTGT CTGAGTTGAT GGACATGTTC    3550
AATGAGGATG TCAGCTCCCA GTAAACCGCC AACCAAGGGT CAACACCAAG    3600
AAAACCAATA GCACAAAACA GCCAATCAGA GACCACCCCA ATACACCAAA    3650
CCAATCAACA CATAACAAAG ATCTCCAGAT CATAGATGAT TAAGAAAAAC    3700
TTAGGATGAA AGGACTAATC AATCCTCCGA AACAATGAGC ATCACCAACT    3750
CCACAATCTA CACATTCCCA GAATCCTCTT TCTCCGAGAA TGGCAACATA    3800
GAGCCGTTAC CACTCAAGGT CAATGAACAG AGAAAGGCCA TACCTCATAT    3850
TAGGGTTGTC AAGATAGGAG ATCCGCCCAA ACATGGATCC AGATATCTGG    3900
ATGTCTTTTT ACTGGGCTTC TTTGAGATGG AAAGGTCAAA AGACAGGTAT    3950
GGGAGCATAA GTGATCTAGA TGATGATCCA AGTTACAAGG TTTGTGGCTC    4000
TGGATCATTG CCACTTGGGT TGGCTAGATA CACCGGAAAT GATCAGGAAC    4050
TCCTACAGGC TGCAACCAAG CTCGATATAG AAGTAAGAAG AACTGTAAAG    4100
GCTACGGAGA TGATAGTTTA CACTGTACAA AACATCAAAC CTGAACTATA    4150
TCCATGGTCC AGTAGATTAA GAAAAGGGAT GTTATTTGAC GCTAATAAGG    4200
TTGCACTTGC TCCTCAATGT CTTCCACTAG ATAGAGGGAT AAAATTCAGG    4250
GTGATATTTG TGAACTGCAC AGCAATTGGA TCAATAACTC TATTCAAAAT    4300
CCCTAAGTCC ATGGCATTGT TATCATTGCC TAATACAATA TCAATAAATC    4350
TACAAGTACA TATCAAAACA GGAGTTCAGA CAGATTCCAA AGGAGTAGTT    4400
CAGATTCTAG ATGAAAAAGG TGAAAAATCA CTAAATTTCA TGGTTCATCT    4450
CGGGTTGATC AAAAGGAAGA TGGGCAGAAT GTACTCAGTT GAATATTGTA    4500
AGCAGAAGAT CGAGAAGATG AGATTATTAT TCTCATTGGG ATTAGTTGGA    4550
GGGATCAGCT TCCACGTCAA CGCAACTGGC TCTATATCAA AGACATTAGC    4600
AAGTCAATTA GCATTCAAAA GAGAAATCTG CTATCCCCTA ATGGATCTGA    4650
ATCCACACTT AAATTCAGTT ATATGGGCAT CATCAGTTGA AATTACAAGG    4700
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FIG. 6B

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GTAGATGCAG TTCTCCAGCC TTCATTACCT GGCGAATTCA GATACTACCC   4750
AAACATCATA GCAAAAGGGG TCGGGAAAAT CAGACAGTAA AATCAACAAC   4800
CCTGATATCC AACATTGCAA ATCAGGCTAC CCACAGGAGA AAAATCAAAA   4850
ACTTAGGATC AAAGGGATCA CCACGAACCC CGGAAAACAG CCAAACAAAC   4900
CAACACACAA ATCACAGACA AAAAGGAGAA GGCACTGCAA AGACCGAGAA   4950
AAAACAGAAC GCACACAACC AAGCAGAGAA AAGCCAAAGC CCGCCATTCA   5000
CAAACACACC AACAATCCTG CAAACAAGCA CCAAAACAGA GGTCAAAAGA   5050
CAAAGAGCAC CAGATATGAC CATCACAACC ACAATCATAG CCATATTACT   5100
AATACCCCCA TCATTTTGTC AAATAGACAT AACAAAACTG CAACGTGTAG   5150
GTGTGTTAGT CAACAATCCT AAAGGCATGA AGATTTCACA AAATTTCGAA   5200
ACGAGATACC TGATATTAAG TTTGATACCC AAAATAGAGA ATTCACACTC   5250
ATGTGGGGAT CAACAGATAA ACCAATACAA GAAGTTATTG GATAGATTGA   5300
TAATTCCTCT ATATGATGGA TTAAAATTAC AAAAAGATGT AATAGTAGTA   5350
AGTCATGAAA CCCACAACAA TACTAATCTT AGGACAAAAC GATTCTTTGG   5400
AGAGATAATT GGGACAATTG CGATAGGGAT AGCCACTTCA GCACAAATCA   5450
CCGCAGCAGT CGCTCTTGTC GAAGCTAAAC AGGCAAAGTC AGACATAGAA   5500
AAACTCAAAG AGGCTATAAG AGACACAAAC AAGGCAGTAC AATCGATTCA   5550
AAGTTCTGTA GGTAACCTAA TTGTTGCAGT TAAATCAGTT CAAGACTATG   5600
TCAACAATGA AATTATACCT TCAATCACAA GATTAGGCTG TGAAGCAGCA   5650
GGGTTACAAT TGGGAATTGC ATTGACACAA CATTACTCAG AATTAACAAA   5700
TATATTTGGT GATAATATAG GAACACTGAA AGAAAAAGGG ATAAAATTAC   5750
AAGGGATAGC ATCATTATAT CACACAAACA TAACGGAAAT ATTTACTACT   5800
TCAACAGTTG ACCAATATGA TATTTATGAC CTATTATTCA CTGAGTCAAT   5850
CAAGATGAGA GTGATAGATG TTGATTTGAG TGATTACTCA ATTACTCTTC   5900
AAGTTAGACT TCCTTTATTA ACTAAACTAT CAAATACTCA AATTTATAAA   5950
GTAGATTCTA TATCATACAA CATCCAGGGC AAAGAGTGGT ATATTCCTCT   6000
TCCCAATCAC ATCATGACAA AAGGGGCTTT TCTAGGTGGT GCTGATATTA   6050
AAGAATGCAT AGAGGCATTC AGCAGTTATA TATGTCCTTC TGATCCAGGT   6100
TACATATTAA ATCACGAGAT AGAGAATTGT TTATCAGGGA ACATAACACA   6150
GTGTCCTAAG ACTGTTGTTA CATCAGATGT GGTACCACGA TACGCGTTTG   6200
TGAATGGTGG ATTAATTGCA AACTGCATAA CAACTACATG TACATGCAAT   6250
GGAATTGACA ATAGAATTAA TCAATCACCT GATCAAGGAA TTAAGATCAT   6300
AACACATAAA GAATGCCAGG TAATAGGTAT AAACGGAATG TTATTCAATA   6350
CTAATAGAGA AGGGACATTA GCAACTTATA CATTTGATGA CATCATATTA   6400
AATAACTCTG TTGCACTTAA TCCAATTGAT ATATCTATGG AACTCAACAA   6450
GGCAAAACTA GAATTAGAAG AATCGAAGGA ATGGATAAAG AAATCAAATC   6500
AAAAGTTAGA TTCCGTTGGA AGTTGGTATC AATCTAGTGC AACAATCACC   6550
ATAATCATAG TGATGATAAT AATTCTAGTT ATAATCAATA TAACAATTAT   6600
TGTAGTCATA ATCAAATTCC ATAGAATTCA GGGGAAAGAT CAAAACGACA   6650
AAAACAGTGA GCCGTATATA CTGACAAATA GACAATAAGA CTATACACGA   6700
TCAAATATAA AAAGTACAAA AAACTTAGGA ACAAAGTTGT TCAACACAGC   6750
AGCACCGAAT AGACCAAAAG GCAGCGCAGA GGCGACACCA AACTCAAAAA   6800
TGGAATATTG GAAACACACA AACAGCATAA ATAACACCAA CAATGAAACC   6850
GAAACAGCCA GAGGCAAACA TAGTAGCAAG GTTACAAATA TCATAATGTA   6900
CACCTTCTGG ACAATAACAT TAACAATATT ATCAGTCATT TTTATAATGA   6950
TATTGACAAA CTTAATTCAA GAGAACAATC ATAATAAATT AATGTTGCAG   7000
GAAATAAGAA AAGAATTCGC GGCAATAGAC ACCAAGATTC AGAGGACTTC   7050
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FIG. 6C

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GGATGACATT GGAACCTCAA TACAGTCAGG AATAAATACA AGACTTCTCA  7100
CAATTCAGAG TCATGTTCAA AACTATATCC CACTATCATT AACACAACAA  7150
ATGTCAGATC TCAGAAAATT TATCAATGAT CTAACAAATA AAAGAGAACA  7200
TCAAGAAGTG CCAATACAGA GAATGACTCA TGATAGAGGT ATAGAACCCC  7250
TAAATCCAAA CAAGTTCTGG AGGTGTACAT CTGGTAACCC ATCTCTAACA  7300
AGTAGTCCTA AGATAAGGTT AATACCAGGA CCAGGTTTAT TAGCAACATC  7350
TACTACAGTA AATGGCTGTA TTAGAATTCC ATCGTTAGTA ATCAATCATC  7400
TAATCTATGC TTACACCTCT AATCTTATTA CCCAGGGCTG TCAAGATATA  7450
GGGAAATCTT ACCAAGTACT ACAAATAGGG ATAATTACTA TAAATTCGGA  7500
CCTAGTACCT GATTTAAACC CCAGAGTCAC ACATACATTT AATATTGATG  7550
ATAATAGAAG ATCTTGCTCT CTGGCACTAT TGAATACAGA TGTTTATCAG  7600
TTATGCTCAA CACCAAAAGT TGATGAAAGA TCCGATTATG CATCAACAGG  7650
TATTGAGGAT ATTGTACTTG ACATTGTCAC TAATAATGGA TTAATTATAA  7700
CAACAAGGTT TACAAATAAT AATATAACTT TTGATAAACC GTATGCAGCA  7750
TTGTATCCAT CAGTGGGACC AGGAATCTAT TATAAGGATA AAGTTATATT  7800
TCTCGGATAT GGAGGTCTAG AGCATGAAGA AAACGGAGAC GTAATATGTA  7850
ATACAACTGG TTGTCCTGGC AAAACACAGA GAGACTGTAA TCAGGCTTCT  7900
TATAGCCCAT GGTTCTCAAA TAGGAGAATG GTAAACTCTA TTATTGTTGT  7950
TGATAAAGGC ATAGATGCAA CTTTTAGCTT GAGGGTGTGG ACTATTCCAA  8000
TGAGCCAAAA TTATTGGGGA TCAGAAGGAA GATTACTTTT ATTAGGTGAC  8050
AGAATATACA TATATACTAG ATCCACAAGT TGGCACAGTA AATTACAGTT  8100
AGGGGTAATT GATATTTCTG ATTATACTAA TATAAGAATA AATTGGACTT  8150
GGCATAATGT ACTATCACGG CCAGGGAATG ATGAATGTCC ATGGGGTCAT  8200
TCATGCCCAG ACGGATGTAT AACAGGAGTT TACACTGATG CATATCCGCT  8250
AAACCCATCG GGGAGTGTTG TATCATCAGT AATTCTTGAT TCACAAAAGT  8300
CTAGAGAAAA CCCAATCATT ACTTACTCAA CAGCTACAAA TAGAATAAAT  8350
GAATTAGCTA TATATAACAG AACACTTCCA GCTGCATATA CAACAACAAA  8400
TTGTATCACA CATTATGATA AAGGGTATTG TTTTCATATA GTAGAAATAA  8450
ATCACAGAAG TTTGAATACG TTTCAACCTA TGTTATTCAA AACAGAAGTT  8500
CCAAAAAACT GCAGCTAAAT TGATCATCGC ATATCGGATG CAAGATGACA  8550
TTAAAAGAGA CCACCAGACA GACAACACAG GAGACGATGC AAGATATAAA  8600
GAAATAATAA AAAACTTAGG AGAAAAGTGT GCAAGAAAAA TGGACACCGA  8650
GTCCCACAGC GGCACAACAT CTGACATTCT GTACCCTGAA TGTCACCTCA  8700
ATTCTCCTAT AGTTAAAGGA AAGATAGCAC AACTGCATAC AATAATGAGT  8750
TTGCCTCAGC CCTACGATAT GGATGATGAT TCAATACTGA TTATTACTAG  8800
ACAAAAAATT AAACTCAATA AATTAGATAA AAGACAACGG TCAATTAGGA  8850
AATTAAGATC AGTCTTAATG GAAAGAGTAA GTGATCTAGG TAAATATACC  8900
TTTATCAGAT ATCCAGAGAT GTCTAGTGAA ATGTTCCAAT TATGTATACC  8950
CGGAATTAAT AATAAAATAA ATGAATTGCT AAGTAAAGCA AGTAAAACAT  9000
ATAATCAAAT GACTGATGGA TTAAGAGATC TATGGGTTAC TATACTATCG  9050
AAGTTAGCAT CGAAAAATGA TGGAAGTAAT TATGATATCA ATGAAGATAT  9100
TAGCAATATA TCAAATGTTC ACATGACTTA TCAATCAGAC AAATGGTATA  9150
ATCCATTCAA GACATGGTTT ACTATTAAGT ATGACATGAG AAGATTACAA  9200
AAAGCCAAAA ATGAGATTAC ATTCAATAGG CATAAAGATT ATAATCTATT  9250
AGAAGACCAA AAGAATATAT TGCTGATACA TCCAGAACTC GTCTTAATAT  9300
TAGATAAACA AAATTACAAT GGGTATATAA TGACTCCTGA ATTGGTACTA  9350
ATGTATTGTG ATGTAGTTGA AGGGAGGTGG AATATAAGTT CATGTGCAAA  9400
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FIG. 6D

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ATTGGATCCT AAGTTACAAT CAATGTATTA TAAGGGTAAC AATTTATGGG     9450
AAATAATAGA TGGACTATTC TCGACCTTAG GAGAAAGAAC ATTTGACATA     9500
ATATCACTAT TAGAACCACT TGCATTATCG CTCATTCAAA CTTATGACCC     9550
GGTTAAACAG CTCAGGGGGG CTTTTTTAAA TCACGTGTTA TCAGAAATGG     9600
AATTAATATT TGCAGCTGAG TGTACAACAG AGGAAATACC TAATGTGGAT     9650
TATATAGATA AAATTTTAGA TGTGTTCAAA GAATCAACAA TAGATGAAAT     9700
AGCAGAAATT TTCTCTTTCT TCCGAACTTT TGGACACCCT CCATTAGAGG     9750
CGAGTATAGC AGCAGAGAAA GTTAGAAAGT ATATGTATAC TGAGAAATGC     9800
TTGAAATTTG ATACTATCAA TAAATGTCAT GCTATTTTTT GTACAATAAT     9850
TATAAATGGA TATAGAGAAA GACATGGTGG TCAATGGCCT CCAGTTACAT     9900
TACCTGTCCA TGCACATGAA TTTATCATAA ATGCATACGG ATCAAATTCT     9950
GCCATATCAT ATGAGAATGC TGTAGATTAT TATAAGAGCT TCATAGGAAT    10000
AAAATTTGAC AAGTTTATAG AGCCTCAATT GGATGAAGAC TTAACTATTT    10050
ATATGAAAGA TAAAGCATTA TCCCCAAAGA AATCAAACTG GGACACAGTC    10100
TATCCAGCTT CAAACCTGTT ATACCGCACT AATGTGTCTC ATGATTCACG    10150
AAGATTGGTT GAAGTATTTA TAGCAGATAG TAAATTTGAT CCCCACCAAG    10200
TATTAGATTA CGTAGAATCA GGATATTGGC TGGATGATCC TGAATTTAAT    10250
ATCTCATATA GTTTAAAAGA GAAAGAAATA AAACAAGAAG GTAGACTTTT    10300
TGCAAAAATG ACATACAAGA TGAGGGCTAC ACAAGTATTA TCAGAAACAT    10350
TATTGGCGAA TAATATAGGG AAATTCTTCC AAGAGAATGG GATGGTTAAA    10400
GGAGAAATTG AATTACTCAA GAGACTAACA ACAATATCTA TGTCTGGAGT    10450
TCCGCGGTAT AATGAGGTAT ACAATAATTC AAAAAGTCAC ACAGAAGAAC    10500
TTCAAGCTTA TAATGCAATT AGCAGTTCCA ATTTATCTTC TAATCAGAAG    10550
TCAAAGAAGT TTGAATTTAA ATCTACAGAT ATATACAATG ATGGATACGA    10600
AACCGTAAGC TGCTTCTTAA CGACAGATCT TAAAAAATAT TGTTTAAATT    10650
GGAGGTATGA ATCAACAGCT TTATTCGGTG ATACTTGTAA TCAGATATTT    10700
GGGTTAAAGG AATTATTTAA TTGGCTGCAC CCTCGCCTTG AAAAGAGTAC    10750
AATATATGTT GGAGATCCTT ATTGCCCGCC ATCAGATATT GAACATTTAC    10800
CACTTGATGA CCATCCTGAT TCAGGATTTT ATGTTCATAA TCCTAAAGGA    10850
GGAATAGAAG GGTTTTGCCA AAAGTTATGG ACACTCATAT CTATCAGTGC    10900
AATACATTTA GCAGCTGTCA AAATCGGTGT AAGAGTTACT GCAATGGTTC    10950
AAGGGGATAA TCAAGCCATA GCTGTTACCA CAAGAGTACC TAATAATTAT    11000
GATTATAAAG TTAAGAAAGA GATTGTTTAT AAAGATGTGG TAAGATTTTT    11050
TGATTCCTTG AGAGAGGTGA TGGATGATCT GGGTCATGAG CTCAAACTAA    11100
ATGAAACTAT AATAAGTAGT AAAATGTTTA TATATAGCAA AAGGATATAC    11150
TATGACGGAA GAATCCTTCC TCAGGCATTA AAAGCATTGT CTAGATGTGT    11200
TTTTTGGTCT GAAACAATCA TAGATGAGAC AAGATCAGCA TCCTCAAATC    11250
TGGCTACATC GTTTGCAAAG GCCATTGAGA ATGGCTACTC ACCTGTATTG    11300
GGATATGTAT GCTCAATCTT CAAAAATATC CAACAGTTGT ATATAGCGCT    11350
TGGAATGAAT ATAAACCCAA CTATAACCCA AAATATTAAA GATCAATATT    11400
TCAGGAATAT TCATTGGATG CAATATGCCT CCTTAATCCC TGCTAGTGTC    11450
GGAGGATTTA ATTATATGGC CATGTCAAGG TGTTTTGTCA GAAACATTGG    11500
AGATCCTACA GTCGCTGCGT TAGCCGATAT TAAAAGATTT ATAAAAGCAA    11550
ATTTGTTAGA TCGAGGTGTC CTTTACAGAA TTATGAATCA AGAACCAGGC    11600
GAGTCTTCTT TTTTAGACTG GGCCTCAGAT CCCTATTCAT GTAACTTACC    11650
ACAATCTCAA AATATAACCA CCATGATAAA GAATATAACT GCAAGAAATG    11700
TACTACAGGA CTCACCAAAC CCATTACTAT CTGGATTATT TACAAGTACA    11750
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FIG. 6E

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ATGATAGAAG AGGATGAGGA ATTAGCTGAG TTCCTAATGG ACAGGAGAAT   11800
AATCCTCCCA AGAGTTGCAC ATGACATTTT AGATAATTCT CTTACTGGAA   11850
TTAGGAATGC TATAGCTGGT ATGTTGGATA CAACAAAATC ACTAATTCGA   11900
GTAGGGATAA GCAGAGGAGG ATTAACCTAT AACTTATTAA GAAAGATAAG   11950
CAACTATGAT CTTGTACAAT ATGAGACACT TAGTAAAACT TTAAGACTAA   12000
TAGTCAGTGA CAAGATTAAG TATGAAGATA TGTGCTCAGT AGACCTAGCC   12050
ATATCATTAA GACAAAAAAT GTGGATGCAT TTATCAGGAG GAAGAATGAT   12100
AAATGGACTT GAAACTCCAG ATCCTTTAGA GTTACTGTCT GGAGTAATAA   12150
TAACAGGATC TGAACATTGT AGGATATGTT ATTCAACTGA AGGTGAAAGC   12200
CCATATACAT GGATGTATTT ACCAGGCAAT CTTAATATAG GATCAGCTGA   12250
GACAGGAATA GCATCATTAA GGGTCCCTTA CTTTGGATCA GTTACAGATG   12300
AGAGATCTGA AGCACAATTA GGGTATATCA AAAATCTAAG CAAACCAGCT   12350
AAGGCTGCTA TAAGAATAGC AATGATATAT ACTTGGGCAT TTGGGAATGA   12400
CGAAATATCT TGGATGGAAG CATCACAGAT TGCACAAACA CGTGCAAACT   12450
TTACATTGGA TAGCTTAAAG ATTTTGACAC CAGTGACAAC ATCAACAAAT   12500
CTATCACACA GGTTAAAAGA TACTGCTACT CAGATGAAAT TTTCTAGTAC   12550
ATCACTTATT AGAGTAAGCA GGTTCATCAC AATATCTAAT GATAATATGT   12600
CTATTAAAGA AGCAAATGAA ACTAAAGATA CAAATCTTAT TTATCAACAG   12650
GTAATGTTAA CAGGATTAAG TGTATTTGAA TATCTATTTA GGTTAGAGGA   12700
GAGTACAGGA CATAACCCTA TGGTCATGCA TCTACATATA GAGGATGGAT   12750
GTTGTATAAA AGAGAGTTAC AATGATGAGC ATATCAATCC GGAGTCTACA   12800
TTAGAGTTAA TCAAATACCC TGAGAGTAAT GAATTTATAT ATGATAAGGA   12850
CCCTTTAAAG GATATAGATC TATCAAAATT AATGGTTATA AGAGATCATT   12900
CTTATACAAT TGACATGAAT TACTGGGATG ACACAGATAT TGTACATGCA   12950
ATATCAATAT GTACTGCAGT TACAATAGCA GATACAATGT CGCAGCTAGA   13000
TCGGGATAAT CTTAAGGAGC TGGTTGTGAT TGCAAATGAT GATGATATTA   13050
ACAGTCTGAT AACTGAATTT CTGACCCTAG ATATACTAGT GTTTCTCAAA   13100
ACATTTGGAG GGTTACTCGT GAATCAATTT GCATATACCC TTTATGGATT   13150
GAAAATAGAA GGAAGGGATC CCATTTGGGA TTATATAATG AGAACATTAA   13200
AAGACACCTC ACATTCAGTA CTTAAAGTAT TATCTAATGC ACTATCTCAT   13250
CCAAAAGTGT TTAAGAGATT TTGGGATTGT GGAGTTTTGA ATCCTATTTA   13300
TGGTCCTAAT ACTGCTAGTC AAGATCAAGT TAAGCTTGCT CTCTCGATTT   13350
GCGAGTACTC CTTGGATCTA TTTATGAGAG AATGGTTGAA TGGAGCATCA   13400
CTTGAGATCT ATATCTGTGA TAGTGACATG GAAATAGCAA ATGACAGAAG   13450
ACAAGCATTT CTCTCAAGAC ATCTTGCCTT TGTGTGTTGT TTAGCAGAGA   13500
TAGCATCTTT TGGACCAAAT TTATTAAATC TAACATATCT AGAGAGACTT   13550
GATGAATTAA AACAATACTT AGATCTGAAC ATCAAAGAAG ATCCTACTCT   13600
TAAATATGTG CAAGTATCAG GACTGTTAAT TAAATCATTC CCCTCAACTG   13650
TTACGTATGT AAGGAAAACT GCGATTAAGT ATCTGAGGAT TCGTGGTATT   13700
AATCCGCCTG AAACGATTGA AGATTGGGAT CCCATAGAAG ATGAGAATAT   13750
CTTAGACAAT ATTGTTAAAA CTGTAAATGA CAATTGCAGT GATAATCAAA   13800
AGAGAAATAA AAGTAGTTAT TTCTGGGGAT TAGCTCTAAA GAATTATCAA   13850
GTCGTGAAAA TAAGATCCAT AACGAGTGAT TCTGAAGTTA ATGAAGCTTC   13900
GAATGTTACT ACACATGGAA TGACACTTCC TCAGGGAGGA AGTTATCTAT   13950
CACATCAGCT GAGGTTATTT GGAGTAAACA GTACAAGTTG TCTTAAAGCT   14000
CTTGAATTAT CACAAATCTT AATGAGGGAA GTTAAAAAAG ATAAAGATAG   14050
ACTCTTTTTA GGAGAAGGAG CAGGAGCTAT GTTAGCATGT TATGATGCTA   14100
```

FIG. 6F

```
CACTCGGTCC TGCAATAAAT TATTATAATT CTGGTTTAAA TATTACAGAT    14150
GTAATTGGTC AACGGGAATT AAAAATCTTC CCATCAGAAG TATCATTAGT    14200
AGGTAAAAAA CTAGGAAATG TAACACAGAT TCTTAATCGG GTGAGGGTGT    14250
TATTTAATGG GAATCCCAAT TCAACATGGA TAGGAAATAT GGAATGTGAG    14300
AGTTTAATAT GGAGTGAATT AAATGATAAG TCAATTGGTT TAGTACATTG    14350
TGACATGGAG GGAGCGATAG GCAAATCAGA AGAAACTGTT CTACATGAAC    14400
ATTATAGTAT TATTAGGATT ACATATTTAA TCGGGGATGA TGATGTTGTC    14450
CTAGTATCAA AAATTATACC AACTATTACT CCGAATTGGT CTAAAATACT    14500
CTATCTATAC AAGTTGTATT GGAAGGATGT AAGTGTAGTG TCCCTTAAAA    14550
CATCCAATCC TGCCTCAACA GAGCTTTATT TAATTTCAAA AGATGCTTAC    14600
TGTACTGTAA TGGAACCCAG TAATCTTGTT TTATCAAAAC TTAAAAGGAT    14650
ATCATCAATA GAAGAAAATA ATCTATTAAA GTGGATAATC TTATCAAAAA    14700
GGAAGAATAA CGAGTGGTTA CAGCATGAAA TCAAAGAAGG AGAAAGGGAT    14750
TATGGGATAA TGAGGCCATA TCATACAGCA CTGCAAATTT TTGGATTCCA    14800
AATTAACTTA AATCACTTAG CTAGAGAATT TTTATCAACT CCTGATTTAA    14850
CCAACATTAA TAATATAATT CAAAGTTTTA CAAGAACAAT TAAAGATGTT    14900
ATGTTCGAAT GGGTCAATAT CACTCATGAC AATAAAAGAC ATAAATTAGG    14950
AGGAAGATAT AATCTATTCC CGCTTAAAAA TAAGGGGAAA TTAAGATTAT    15000
TATCACGAAG ATTAGTACTA AGCTGGATAT CATTATCCTT ATCAACCAGA    15050
TTACTGACGG GCCGTTTTCC AGATGAAAAA TTTGAAAATA GGGCACAGAC    15100
CGGATATGTA TCATTGGCTG ATATTGATTT AGAATCCTTA AAGTTATTAT    15150
CAAGAAATAT TGTCAAAAAT TACAAAGAAC ACATAGGATT AATATCATAC    15200
TGGTTTTTGA CCAAAGAGGT CAAAATACTA ATGAAGCTTA TAGGAGGAGT    15250
CAAACTACTA GGAATTCCTA AACAGTACAA AGAGTTAGAG GATCGATCAT    15300
CTCAGGGTTA TGAATATGAT AATGAATTTG ATATTGATTA ATACATAAAA    15350
ACATAAAATA AAACACCTAT TCCTCACCCA TTCACTTCCA ACAAAATGAA    15400
AAGTAAGAAA AACATGTAAT ATATATATAC CAAACAGAGT TTTTCTCTTG    15450
TTTGGT                                                   15456
```

FIG. 6G

```
ACCAAACAAG AGAAGAGACT TGCTTGGGAA TATTAATTCA AATAAAAATT      50
AACTTAGGAT TAAAGAACTT TACCGAAAGG TAAGGGGAAA GAAATCCTAA     100
GACTGTAATC ATGTTGAGTC TATTCGACAC ATTCAGTGCG CGTAGGCAGG     150
AGAACATAAC AAAATCAGCT GGTGGGGCTG TTATTCCCGG GCAAAAAAAC     200
ACTGTGTCTA TATTTGCTCT TGGACCATCA ATAACAGATG ACAATGACAA     250
AATGACATTG GCTCTTCTCT TTTTGTCTCA TTCTTTAGAC AATGAAAAGC     300
AGCATGCGCA AAGAGCTGGA TTTTTAGTTT CTCTGTTATC AATGGCTTAT     350
GCCAACCCAG AATTATATTT AACATCAAAT GGTAGTAATG CAGATGTTAA     400
ATATGTCATC TACATGATAG AGAAAGACCC AGGAAGACAG AAATATGGTG     450
GGTTTGTCGT CAAGACTAGA GAGATGGTTT ATGAAAAGAC AACTGACTGG     500
ATGTTTGGGA GTGATCTTGA GTATGATCAA GACAATATGT TGCAAAATGG     550
TAGAAGCACT TCTACAATCG AGGATCTTGT TCATACTTTT GGATATCCAT     600
CGTGTCTTGG AGCCCTTATA ATCCAGGTTT GGATAATACT TGTTAAGGCT     650
ATAACCAGTA TATCAGGATT GAGGAAAGGA TTCTTTACTC GGTTAGAAGC     700
ATTTCGACAA GATGGAACAG TTAAATCCAG TCTAGTGTTG AGCGGTGATG     750
CAGTAGAACA AATTGGATCA ATTATGAGGT CCCAACAGAG CTTGGTAACA     800
CTCATGGTTG AAACACTGAT AACAATGAAC ACAGGCAGGA ATGACCTGAC     850
AACAATAGAA AAGAATATAC AGATTGTAGG AAACTACATC AGAGATGCAG     900
GTCTTGCTTC ATTTTTCAAC ACAATCAGAT ATGGCATTGA GACTAGAATG     950
GCAGCTCTAA CTCTGTCTAC CCTTAGACCG GACATCAACA GACTCAAGGC    1000
ACTGATAGAG CTATATCTAT CAAAGGGGCC ACGTGCTCCT TTTATATGCA    1050
TTTTGAGAGA TCCTGTGCAT GGTGAGTTTG CACCAGGCAA CTATCCTGCC    1100
CTCTGGAGTT ATGCGATGGG TGTAGCAGTT GTACAAAACA AGGCCATGCA    1150
ACAGTATGTA ACAGGAAGGT CCTATCTGGA TATTGAAATG TTCCAACTGG    1200
GTCAAGCAGT GGCACGTGAC GCCGAGTCGC AGATGAGTTC AATATTAGAG    1250
GATGAACTGG GGGTCACACA AGAAGCCAAG CAAAGCTTGA AGAAACACAT    1300
GAAGAACATC AGCAGTTCAG ATACAACCTT CTATAAGCCT ACAGGGGGAT    1350
CAGCCATAGA AATGGCAATA GATGAGGAAG CAGAGCAGCC CGAATCCAGA    1400
GGAGACCAAG ACCAAGGAGA TGAACCTCGG TCATCCATAG TTCCTTATGC    1450
ATGGGCAGAC GAAACCGGGA ATGACAACCA AACTGAATCA ACCACAGAAA    1500
TTGACAGCAT CAAAACTGAA CAAAGAAACA TCAGAGACAG GCTGAACAAA    1550
AGACTCAACG AGAAAAGGAA ACAGAGTAAC CCGGGATCAA CTGACATCAC    1600
AAACAACACA AATCAAACTG AAATAGATGA TTTATTCAGT GCATTCGGAA    1650
GCAACTAGTC ACAAAGAGAT GACCACCATC ATCAGCAACA AGTAAGAAAA    1700
ACTTAGGATT AATGGAAATT ATCCAATCCG GAGACGGAAG GACAAATCCA    1750
GAATCCAACC ACAACTCAAT CAACCAAAGA TTCATGGAAG ACAATGTTCA    1800
AAACAATCAA ATCATGGATT CTTGGGAAGA GGGATCAGGA GATAAATCAT    1850
CTGACATCTC ATCGGCCCTC GACATCATTG AATTCATACT CAACACCGAC    1900
TCCCAAGAGA ACACGGCAGA CAGCAATGAA ATCAACACAG GAGCCACAAG    1950
ACTTAGCACG ACAATCTACC AACTTGAGTC CAAAACAACA GAAACAAGCA    2000
AGGAAAATAG TGGACCAGCT AACAAAAATC GACAGTTTGG GGCATCACAC    2050
GAACGTGCCA CAGAGACAAA AGATAGAAAT GTTAATCAGA AGACTGTACA    2100
GGGAGGATAT AGGAGAGGAA GCAGCCCAGA TAGTAGAACT GAGACTATGG    2150
TCACTCGAGG AATCTCCAGA AGCAGCCCAG ATCCTAACAA TGGAACCCAA    2200
ATCCAGGAAG ATATTGATTA CAATGAAGTT GGAGAGATGG ATAAGGACTC    2250
TACTAAGAGG GAAATGCGAC AATTTAAAGA TGTTCCAGTC AAGGTATCAG    2300
GAAGTGATGC CATTCCTCCA ACAAAACAAG ATGGAGACGG TGATGATGGA    2350
```

FIG. 7A

```
AGAGGCCTGG AATCTATCAG TACATCTGAT TCAGGATATA CCAGTATAGT     2400
GACTGCCGCA ACACTAGATG ACGAAGAAGA ACTCCTTATG AAGAACAACA     2450
GGCCAAGAAA GTATCAATCA ACACCCCAGA ACAGTGACAA GGGAATTAAA     2500
AAAGGGAGTG GAAGGCCAAA AGACACAGAC AAACAATCAC CAATATTGGA     2550
CTACGAACTC AACTCCAAAG GATCGAAGAA GAGCCAGAAA ATCCTCAAAG     2600
CCAGCACGAA TACAGGAGAA CCAACAAGAT CACAGAGTGG ATCCCAGGGG     2650
AAGAGAATCA CATCCTGGAA CATCCTCAAC AGCGAGAGCG GCAATCGAGC     2700
AGAATCAACA AACCAAACCC ATCAGACATC AATCTCGGGA CAGAACCACA     2750
CAATGGGACC AAGCAGAACA ACCTCAGAAC CAAGGACCAA GACACAAAAG     2800
ACGGATGGAA AGGAAAGAGA GGACACAGAA GAGAGCACTC GATTTACAGA     2850
AAGGGCGATT ACATTATTAC AGAATCTTGG TGTAATCCAA TCTGCAGCAA     2900
AATTAGACCT ATACCAAGAC AAGAGAGTTG TGTGTGTGGC GAATGTCCTA     2950
AACAATGCAG ATACTGCATC AAAGATAGAC TTCCTAGCAG GTTTGATGAT     3000
AGGAGTGTCA ATGGATCATG ATGTCAAATT AAATCAGATT CAGAACGAGA     3050
TATTAAGTTT AAAAACTGAT CTTAAGAAGA TGGATGAATC ACATAGAAGA     3100
CTAATTGAGA ATCAAAAAGA ACAATTATCA CTGATCACAT CATTAATCTC     3150
AAATCTTAAA ATCATGACAG AGAGAGGAGG GAAGAAGGAC CAACCAGAAC     3200
CTAGCGGGAG GACATCCATG ATCAAGACAA AGGCAAAAGA AGAGAGAATA     3250
AAGAAAGTCA GGTTTGACCC TCTTATGGAA ACACAGGGCA TCGAGAAAAA     3300
CATCCCTGAC CTCTACAGAT CAATAGAGAA AACACCAGAA AACGACACAC     3350
AGATCAAATC AGAAATAAAC AGATTGAATG ATGAATCCAA TGCCACTAGA     3400
TTAGTACCTA GAAGAATAAG CAGTACAATG AGATCACTAA TAATAATCAT     3450
CAACAACAGC AATTTATCAT CAAAAGCAAA GCAATCATAC ATCAACGAAC     3500
TCAAGCTCTG CAAGAGTGAT GAGGAAGTGT CTGAGTTGAT GGACATGTTC     3550
AATGAGGATG TCAGCTCCCA GTAAACCGCC AACCAAGGGT CAACACCAAG     3600
AAAACCAACA GCACAAAACA GCCAATAAGA GACCATCCCA ACACACCGAA     3650
CCAATCAACA CATAACAAAG ATCTTTAGAT CATAGATGAC TAAGAAAAAC     3700
TTAGGATGAA AGGACTGATC AATCCTCCAA AACAATGAGC ATCACCAGCT     3750
CCACAATCTA CACATTCCCA GAATCCTCTT TCTCCGAGAA TGGCAACATA     3800
GAGCCGTTAC CACTCAAGGT CAATGAACAG AGAAAGGCCA TACCTCATAT     3850
TAGGGTTGTC AAGATAGGAG ATCCGCCCAA ACATGGATCC AGATATCTGG     3900
ATGTCTTTTT ACTGGGCTTC TTTGAAATGG AAAGGTCAAA AGACAGGTAT     3950
GGGAGCATAA GTGATCTAGA TGATGATCCA AGTTACAAGG TTTGTGGCTC     4000
TGGATCATTG CCACTTGGGT TGGCTAGATA CACTGGAAAT GATCAGGAAC     4050
TCCTACAGGC TGCAACCAAG CTCGATATAG AAGTAAGAAG AACTGTAAAG     4100
GCTACGGAGA TGATAGTTTA CACTGTGCAA AACATCAAAC CTGAACTATA     4150
TCCATGGTCC AGTAGATTAA GAAAAGGGAT GTTATTTGAC GCTAACAAGG     4200
TTGCACTTGC TCCTCAATGT CTTCCACTAG ATAGAGGGAT AAAATTCAGG     4250
GTGATATTTG TGAACTGCAC AGCAATTGGA TCAATAACTC TATTCAAAAT     4300
CCCCAAGTCC ATGGCATTGT TATCATTGCC TAATACAATA TCAATAAATC     4350
TACAAGTACA TATCAAAACA GGAATTCAGA CAGATTCCAA AGGAGTAGTT     4400
CAGATTCTAG ATGAAAAAGG TGAAAAATCA CTAAATTTCA TGGTTCATCT     4450
CGGGTTGATC AAAAGGAAGA TGGGTAGAAT GTACTCAGTT GAATATTGTA     4500
AGCAGAAGAT TGAGAAGATG AGATTATTAT TCTCATTGGG ATTAGTTGGA     4550
GGGATCAGCT TCCACGTCAA CGCAACTGGC TCTATATCAA AGACATTAGC     4600
AAGTCAATTA GCATTTAAAA GAGAAATCTG CTATCCCCTA ATGGATCTGA     4650
ATCCACACTT AAATTTAGTT ATATGGGCAT CATCAGTTGA AATTACAAGA     4700
```

FIG. 7B

```
GTAGATGCAA TTCTCCAGCC TTCATTACCT GGCGAATTCA GATACTACCC  4750
AAACATCATA GCAAAAGGGG TCGGGAAAAT CAGACAGTAA AACCAACAAC  4800
CCTGACATCC AACACTGCAA ATCAGGCTAC CCACAGGAGA AAAATCAAAA  4850
ACTTAGGATC AAAGGGATCA CCACAAACCC CGGGAAACAG CCAAACCAAC  4900
CAACACACAA ATCACAGACA AAAAGGAAAA GGCACTGCAA AGACCGAGAA  4950
CAAGCAGAAC GCACACAACC AAGCAGAGGA AAGCCAAAGC CCGCCATTCA  5000
CAAACACACC AACAATCCTA CAAACAAGCA CCAAAATAGA GGTCAAAAGA  5050
CAAAGAGCAT CAGATATGAC CATCACAACC ATAATCATAG CCATACTACT  5100
AATACCCCTA TCATTCTGTC AAATAGACAT AACAAAACTG CAACGTGTAG  5150
GTGTATTAGT CAACAATCCC AAAGGCATGA AAATTTCACA AAATTTTGAA  5200
ACGAGATACC TGATATTAAG TCTGATACCC AAAATAGAGA ATTCACACTC  5250
ATGTGGGGAT CAACAGATAA ACCAATACAA GAAGTTATTG GATAGATTGA  5300
TAATTCCTCT ATATGATGGA TTAAAATTAC AAAAAGATGT AATAGTAGTA  5350
AGTCATGAAA CCCATAATAA TACTAATCTT AGGACAAAAC GATTCTTTGG  5400
AGAGATAATT GGGACAATTG CGATAGGGAT AGCCACCTCA GCGCAAATCA  5450
CCGCAGCAGT CGCTCTTGTC GAAGCTAAAC AGGCAAGGTC AGACATAGAA  5500
AAACTCAAAG AAGCTATAAG AGACACAAAC AAGGCAGTAC AATCGATTCA  5550
AAGTTCTGTA GGTAACCTAA TTGTTGCAGT TAAATCAGTT CAAGACTATG  5600
TCAACAATGA AATTGTACCT TCAATCACAA GATTAGGCTG TGAAGCAGCA  5650
GGGTTACAAT TGGGAATTGC ACTGACACAA CATTACTCAG AATTAACAAA  5700
TATATTTGGT GATAATATAG GAACACTGAA AGAAAAAGGG ATAAAATTAC  5750
AGGGGATAGC ATCGTTATAT CATACAAACA TAACAGAAAT ATTTACTACT  5800
TCAACAGTTG ACCAATATGA TATTTATGAC CTATTATTCA CTGAATCAAT  5850
CAAGATGAGA GTGATAGATG TTGATTTGAG TGATTACTCA ATTACTCTTC  5900
AAGTTAGACT TCCTTTATTA ACTAAACTAT CAAATACTCA GATTTATAAA  5950
GTAGATTCTA TATCATACAA CATCCAGGGC AAAGAGTGGT ATATTCCTCT  6000
TCCCAATCAC ATCATGACAA AAGGGGCTTT TCTAGGTGGT GCTGATATTA  6050
AAGAATGCAT AGAGGCATTC AGCAGTTATA TATGTCCTTC TGATCCAGGT  6100
TATATATTAA ATCACGAGAT AGAGAATTGT TTATCAGGGA ACATAACACA  6150
GTGTCCTAAG ACTGTTGTTA CATCAGATGT GGTACCACGA TACGCGTTTG  6200
TGAATGGTGG ATTAATTGCA AACTGCATAA CAACTACATG TACATGCAAT  6250
GGAATTGACA ATAGAATTAA TCAATCACCT GATCAAGGAA TTAAGATCAT  6300
AACACATAAA GAATGCCAGG TAATAGGTAT AAACGGAATG TTATTCAATA  6350
CTAATAGAGA AGGGACATTA GCAACTTATA CATTTGATGA CATTATATTA  6400
AATAACTCTG TTGCACTTAA TCCAATTGAT ATATCTATGG AACTTAACAA  6450
GGCAAAACTA GAATTAGAAG AATCGAAGGA ATGGATAAAG AAATCAAATC  6500
AAAAGTTAGA TTCCGTTGGA AGTTGGTATC AATCTAGTGC AACAATCACC  6550
ATAATCATAG TGATGATAAT AATTCTATTT ATAATCAATA TAACAATTAT  6600
TGTAGTCATA ATCAAATTCT ATAGAATTAA GGGGGAAAAT CAAAACGACA  6650
AAAACAGTGA GCCGTATATA CTGACAAATA GACAATAAGA CTATACACGA  6700
TCAAATATAG AAAGTACAAA AAACTTAGGA ACAAAGTTGT TCAACACAGC  6750
AGCAGCGAAC AGACCCAAAG GCAGCGCAGA GGCGACACCG AACCCAAAAA  6800
TGGAATATTG GAAACACACA AACAGCACAA AAAACACCAA CAATGAAACC  6850
GAAACAACCA GAGGCAAACA CAGTAGCAAG GTTACAAATA TCATAATGTA  6900
CACCTTCTGG ACAATAACAT CAACAATATT ATTAGTCATT TTTATAATGA  6950
TATTGACAAA CTTAATTCAA GAGAACAATC ATAATAAATT AATGTTGCAG  7000
GAAATAAGAA AAGAATTCGC GGCAATAGAC ACCAAGATTC AGAGGACCTC  7050
```

FIG. 7C

```
GGATGACATT GGAACCTCAA TACAGTCAGG AATAAATACA AGACTTCTCA 7100
CAATTCAGAG TCATGTTCAA AACTATATCC CACTATCACT AACACAACAA 7150
ATGTCAGATC TCAGAAAATT TATCAATGAT CTAACAAATA AAAGAGAACA 7200
TCAAGAAGTG CCAATACAGA GAATGACTCA TGATAGAGGT ATAGAACCCC 7250
TAAATCCAGA CAAGTTCTGG AGGTGTACAT CTGGTAACCC ATCTCTAACA 7300
AGTAGTCCTA AGATAAGGTT AATACCAGGG CCAGGTTTAT TAGCAACATC 7350
TACTACAGTA AATGGCTGTA TTAGAATCCC ATCGTTAGCA ATCAATCATT 7400
TAATCTACGC TTACACCTCT AATCTTATCA CCCAGGGCTG TCAAAATATA 7450
GGGAAATCTT ACCAAGTACT ACAAATAGGG ATAATTACTA TAAATTCGGA 7500
CCTAGTACCT GATTTAAATC CCAGAGTCAC ACATACATTT AATATTGATG 7550
ATAATAGGAA ATCTTGCTCT CTGGCACTAT TGAATACAGA TGTTTATCAG 7600
TTATGCTCAA CACCAAAAGT TGATGAGAGA TCCGATTATG CATCAACAGG 7650
TATTGAGGAT ATTGTACTTG ACATTGTCAC TAATAATGGA TTAATTATAA 7700
CAACAAGGTT TACAAATAAT AATATAACTT TTGATAAACC GTATGCAGCA 7750
TTGTATCCAT CAGTAGGACC AGGAATCTAT TATAAGGGTA AAGTTATATT 7800
TCTCGGATAT GGAGGTCTAG AGCATGAAGA AAACGGAGAC GTAATATGTA 7850
ATACAACTGG TTGTCCTGGC AAAACACAGA GAGACTGTAA TCAGGCTTCT 7900
TATAGCCCAT GGTTCTCAAA TAGGAGAATG GTAAACTCTA TTATTGTTGT 7950
TGATAAAGGC ATAGATGCAA CTTTTAGCTT GAGGGTGTGG ACTATTCCAA 8000
TGAGCCAAAA TTATTGGGGA TCAGAAGGAA GATTACTTTT ATTAGGTGAC 8050
AGAATATACA TATATACTAG ATCCACAAGT TGGCACAGTA AATTACAGTT 8100
AGGGGTAATT GATATTTCTG ATTATAATAA TATAAGAATA AATTGGACTT 8150
GGCATAATGT ACTATCACGG CCAGGAAATG ATGAATGTCC ATGGGGTCAT 8200
TCATGCCCAG ACGGATGTAT AACAGGAGTT TACACTGATG CATATCCGCT 8250
AAACCCATCG GGGAGTGTTG TATCATCAGT AATTCTTGAC TCACAAAAGT 8300
CTAGAGAAAA CCCAATCATT ACCTACTCAA CAGCTACAAA TAGAATAAAT 8350
GAATTAGCTA TATATAACAG AACACTTCCA GCTGCATATA CAACAACAAA 8400
TTGTATCACA CATTATGATA AAGGGTATTG TTTTCATATA GTAGAAATAA 8450
ATCACAGAAG TTTGAATACG TTTCAACCTA TGTTATTCAA AACAGAAGTT 8500
CCAAAAAACT GCAGCTAAAT TGATCATCGC ATATCGGATG CCAGATGACA 8550
TTAAAAGAGA CCACCAGACA GACAACACAG GAGATGATGC AAGATATAAA 8600
GGAATAATAA AAAACTTAGG AGAAAAGTGT GCAAGAAAAA TGGACACTGA 8650
ATCCCACAGC GGCACAACAT CTGACATTCT GTACCCTGAA TGTCACCTCA 8700
ATTCTCCTAT AGTTAAAGGA AAAATAGCAC AACTGCATAC AATAATGAGT 8750
TTGCCCCAAC CCTACGATAT GGATGATGAT TCAATACTGA TTATTACTAG 8800
ACAAAAAATC AAACTCAATA AATTAGATAA AAGACAACGG TCAATTAGGA 8850
AATTAAGATC AGTCTTAATG GAAAGAGTAA ATGATCTTGG TAAATACACC 8900
TTTATCAGAT ATCCAGAAAT GTCTAGTGAA ATGTTCCAAT TATGTATACC 8950
CGGAATTAAT AATAAAATAA ATGAATTGCT AAGTAAAGCA AGTAAAACAT 9000
ATAATCAAAT GACTGATGGA TTAAGAGATC TATGGGTTAC TGTACTATCG 9050
AAGTTAGCAT CGAAAAATGA TGGAAGTAAT TATGATATCA ATGAAGATAT 9100
TAGCAATATA TCAAATGTTC ACATGACTTA CCAATCAGAC AAATGGTATA 9150
ATCCATTCAA GACATGGTTT ACTATTAAGT ATGACATGAG GAGATTACAA 9200
AAAGCCAAAA ATGAGATTAC ATTCAATAGG CATAAAGATT ATAATCTATT 9250
AGAAGACCAA AAGAATATAT TGCTGATACA TCCAGAACTC GTCTTAATAT 9300
TAGATAAACA AAATTACAAT GGGTATATAA TGACTCCTGA ATTGGTACTA 9350
ATGTATTGTG ATGTAGTTGA AGGGAGGTGG AATATAAGTT CATGTGCAAA 9400
```

FIG. 7D

```
ATTGGATCCT AAATTACAAT CAATGTATTA TAAAGGTAAC AATTTATGGG     9450
AAATAATAGA TGGACTATTC CTGACCTTAG GAGAAAGAAC ATTTGACATA     9500
ATATCACTAT TAGAACCGCT TGCATTATCG CTCATTCAAA CTCATGACCC     9550
GGTTAAACAG CTCAGAGGGG CTTTTTTAAA TCACGTGTTA TCAGAAATGG     9600
AATCAATATT CGCAGCTGAG TGTACAACAG AGGAAATACC TAATGTGGAT     9650
TATATAGATA AAATTTTAGA TGTATTCAAA GAATCAACAA TAGATGAAAT     9700
AGCAGAAATT TTCTCTTTCT TCCGAACTTT TGGACACCCT CCATTAGAGG     9750
CGAGTATAGC AGCAGAGAAA GTTAGAAAGT ATATGTACAC TGAGAAATGT     9800
TTGAAATTTG ATACTATCAA TAAATGTCAT GCTATTTTTT GTACAATAAT     9850
TATAAATGGA TATAGAGAAA GACATGGTGG TCAATGGCCT CCAGTTACAT     9900
TACCTATTCA TGCACATGAA TTTATCATAA ATGCGTACGG ATCAAATTCT     9950
GCCATATCAT ATGAAAATGC TGTAGATTAT TATAAGAGCT TCATAGGAAT    10000
AAAATTTGAC AAGTTTATAG AGCCTCAATT GGATGAAGAC TTAACTATTT    10050
ATATGAAAGA TAAAGCATTA TCCCCAAAGA AATCTAACTG GGACACAGTC    10100
TATCCAGCTT CAAACCTGTT ATACCGCACT AATGTGTCTC ATGATTCACG    10150
AAGATTGGTT GAAGTATTTA TAGCAGATAG TAAATTTGAT CCCCACCAAG    10200
TATTAGATTA CGTAGAATCA GGATATTGGC TAGATGATCC TGAATTTAAT    10250
ATCTCATATA GTTTAAAAGA GAAAGAAATA AAACAAGAAG GTAGACTTTT    10300
TGCAAAAATG ACATACAAGA TGAGAGCTAC ACAAGTATTA TCAGAAACAT    10350
TATTGGCGAA TAATATAGGG AAATTCTTCC AAGAGAATGG GATGGTTAAA    10400
GGAGAAATTG AATTACTCAA GAGACTGACA ACAATATCTA TGTCTGGGGT    10450
TCCGCGGTAT AATGAGGTAT ACAATAATTC AAAAAGTCAC ACAGAGGAAC    10500
TTCAAGCTTA TAATGCAATT AGCAGTTCCA ATTTATCTTC TAATCAGAAG    10550
TCAAAGAAGT TTGAATTTAA ATCAACAGAT ATATACAATG ATGGATACGA    10600
AACCGTAAGC TGCTTCTTAA CGACAGATCT TAAAAAATAT TGTTTAAATT    10650
GGAGGTATGA ATCAACAGCT TTATTCGGTG ATACTTGTAA TCAGATATTT    10700
GGGTTAAAGG AATTATTTAA TTGGCTGCAC CCTCGCCTTG AAAAGAGTAC    10750
AATATATGTT GGAGATCCTT ATTGCCCGCC ATCAGATATT GAACATTTAC    10800
CACTTGATGA CCATCCTGAT TCAGGATTTT ATGTTCATAA TCCTAAAGGA    10850
GGAATAGAAG GGTTTTGCCA AAAGTTATGG ACACTCATAT CTATCAGTGC    10900
CATACATTTA GCAGCTGTCA AAATCGGTGT AAGAGTTACT GCAATGGTTC    10950
AAGGGGATAA TCAAGCCATA GCTGTTACCA CCAGAGTACC TAATAATTAT    11000
GATTATAAGG TTAAGAAAGA GATTGTTTAT AAAGATGTGG TAAGATTTTT    11050
TGATTCTTTG AGAGAGGTTA TGGATGATCT GGGTCATGAG CTCAAACTAA    11100
ATGAAACTAT AATAAGTAGT AAAATGTTTA TATATAGCAA AAGGATATAC    11150
TATGACGGAA GAATCCTTCC TCAGGCGTTA AAAGCATTGT CTAGATGTGT    11200
TTTTTGGTCT GAAACAATCA TAGATGAGAC AAGATCAGCA TCCTCAAATC    11250
TGGCGACATC GTTTGCAAAG GCCATTGAGA ATGGCTACTC ACCTGTATTG    11300
GGATATGTAT GCTCAATCTT CAAAAATATC CAACAGTTGT ATATAGCACT    11350
TGGAATGAAT ATAAATCCAA CTATAACCCA AAATATTAAA GATCAATATT    11400
TCAGGAATAT TCATTGGATG CAATATGCAT CTCTAATCCC TGCTAGTGTC    11450
GGAGGATTTA ATTATATGGC CATGTCAAGG TGTTTTGTCA GAAACATTGG    11500
AGATCCTACA GTCGCTGCAT TAGCTGATAT TAAAAGATTT ATAAAAGCAA    11550
ATTTGTTAGA TCGAGGTGTC CTTTACAGAA TTATGAATCA GGAACCAGGC    11600
GAGTCCTCCT TTTTAGACTG GGCTTCAGAC CCCTATTCAT GTAACTTACC    11650
ACAATCTCAA AATATAACCA CCATGATAAA GAATATAACT GCAAGAAATG    11700
TACTACAGGA CTCACCAAAC CCATTACTAT CTGGATTATT TACAAGTACA    11750
```

FIG. 7E

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ATGATAGAAG AGGATGAGGA ATTAGCTGAG TTCCTAATGG ACAGGAGAAT    11800
AATTCTCCCA AGGGTTGCGC ATGACATTTT AGATAATTCT CTTACTGGAA    11850
TTAGGAATGC TATAGCTGGT ATGTTGGATA CAACAAAATC ACTAATTCGA    11900
GTAGGGATAA ACAGAGGAGG ATTAACCTAT AACTTATTAA GAAAGATAAG    11950
CAACTATGAT CTTGTACAAT ATGAGACACT TAGTAAAACT TTAAGACTAA    12000
TAGTCAGTGA CAAGATTAAG TATGAAGATA TGTGCTCAGT AGACCTAGCC    12050
ATATCATTAA GACAAAAAAT GTGGATGCAT TTATCAGGAG GAAGAATGAT    12100
AAATGGACTT GAAACTCCAG ATCCTTTAGA GTTACTGTCT GGAGTAATAA    12150
TAACAGGATC TGAGCATTGT AGGATATGTT ATTCAACTGA AGGTGAAAGC    12200
CCATATACAT GGATGTATTT ACCAGGCAAT CTTAATATAG GATCAGCTGA    12250
AACAGGAATA GCATCATTAA GGGTCCCTTA CTTTGGATCA GTTACGGATG    12300
AGAGATCTGA AGCACAATTG GGGTATATCA AAAATCTAAG CAAACCAGCT    12350
AAGGCTGCTA TAAGAATAGC AATGATATAT ACTTGGGCAT TTGGGAATGA    12400
CGAAATATCT TGGATGGAAG CATCACAGAT TGCACAAACA CGTGCGAACT    12450
TTACATTAGA TAGCTTAAAG ATTTTGACAC CAGTGACAAC ATCAACAAAT    12500
CTATCACATA GGTTAAAAGA TACTGCTACT CAGATGAAAT TTTCTAGTAC    12550
ATCACTTATT AGAGTAAGCA GGTTCATCAC AATATCTAAT GATAATATGT    12600
CTATTAAAGA GGCAAATGAA ACTAAAGATA CAAATCTTAT TTATCAACAG    12650
GTAATGTTAA CAGGGTTAAG TGTATTTGAA TATCTATTTA GGTTAGAGGA    12700
GAGTACAGGA CATAACCCTA TGGTCATGCA TCTACATATA GAGGATGGAT    12750
GTTGTATCAA AGAGAGTTAC AATGATGAGC ATATCAATCC GGAGTCTACA    12800
TTAGAGTTAA TTAAATACCC TGAGAGTAAT GAATTTATAT ATGATAAGGA    12850
CCCTTTAAAG GATATAGATC TATCAAAATT AATGGTTATA AGAGATCATT    12900
CTTATACAAT TGACATGAAT TACTGGGACG ACACAGATAT TGTACATGCA    12950
ATATCAATAT GTACTGCAGT TACAATAGCA GATACAATGT CGCAGCTAGA    13000
TCGGGATAAT CTTAAGGAGC TGGTTGTAAT TGCAAATGAT GATGATATTA    13050
ACAGTCTGAT AACTGAATTT CTGACCCTAG ATATACTAGT GTTTCTCAAA    13100
ACATTTGGAG GGTTACTCGT GAATCAATTT GCATATACCC TTTATGGATT    13150
GAAAATAGAA GGAAGGGATC CCATTTGGGA TTATATAATG AGAACATTAA    13200
AAGACACCTC ACATTCAGTA CTTAAAGTAT TATCTAATGC ACTATCTCAT    13250
CCAAAAGTGT TTAAGAGATT TTGGGATTGT GGAGTTTTGA ATCCTATTTA    13300
TGGTCCTAAT ACTGCTAGTC AGGACCAAGT TAAGCTTGCT CTCTCAATTT    13350
GCGAGTACTC CTTGGATCTA TTTATGAGAG AATGGCTGAA TGGAGCATCA    13400
CTTGAGATCT ATATCTGTGA TAGTGACATG GAAATAGCAA ATGATAGAAG    13450
ACAAGCATTT CTCTCAAGAC ACCTTGCCTT TGTGTGTTGT TTAGCAGAGA    13500
TAGCATCTTT TGGACCAAAT TTATTAAATC TAACATATCT AGAGAGACTT    13550
GACGAATTAA AACAATACTT GGATCTGAAC ATCAAAGAAG ATCCTACTCT    13600
TAAATATGTG CAAGTATCAG GACTGTTAAT TAAATCATTC CCCTCAACTG    13650
TTACGTATGT GAGGAAAACT GCGATTAAGT ATCTGAGGAT TCGTGGCATT    13700
AATCCGCCTG AAACGATTGA AGATTGGGAT CCCATAGAAG ATGAGAATAT    13750
CTTAGACAAT ATTGTTAAAA CTGTAAATGA CAATTGCAGT GATAATCAAA    13800
AGAGAAATAA AAGTAGTTAT TTCTGGGGAT TAGCTCTAAA GAATTATCAA    13850
GTCGTAAAAA TAAGATCCAT AACGAGTGAT TCTGAAGTTA ATGAAGCTTC    13900
GAATGTTACT ACACATGGAA TGACACTTCC TCAGGGAGGA AGTTATCTAT    13950
CACATCAGCT GAGGTTATTT GGAGTAAACA GTACAAGTTG TCTGAAAGCT    14000
CTTGAATTGT CACAAATTTT AATGAGGGAA GTTAAAAAAG ATAAAGATAG    14050
ACTCTTTTTA GGAGAAGGAG CAGGAGCTAT GTTAGCATGT TATGATGCTA    14100
```

FIG. 7F

```
CACTCGGTCC TGCAATAAAT TATTACAATT CTGGTTTAAA TATTACAGAT    14150
GTAATTGGTC AACGGGAATT AAAAATCTTC CCATCAGAAG TATCATTAGT    14200
AGGTAAAAAA CTAGGAAATG TAACACAGAT TCTTAATCGG GTGAGGGTGT    14250
TATTTAATGG GAATCCCAAT TCAACATGGA TAGGAAATAT GGAATGTGAG    14300
AGTTTAATAT GGAGTGAATT AAATGATAAG TCAATTGGTT TAGTACATTG    14350
TGACATGGAG GGAGCAATAG GCAAATCAGA AGAAACTGTT TTACATGAAC    14400
ATTATAGTAT TATTAGGATT ACATATTTAA TTGGGGATGA TGATGTTGTT    14450
CTAGTATCAA AAATTATACC AACTATTACT CCGAATTGGT CTAAAATACT    14500
CTATCTATAC AGGTTGTATT GGAAGGATGT GAGTGTAGTG TCCCTTAAAA    14550
CATCCAATCC TGCCTCAACA GAGCTTTATT TAATTTCAAA GGATGCTTAC    14600
TGTACTGTAA TGGAACCCAG TAATCTTGTT TTATCAAAAC TTAAAAGGAT    14650
ATCATCAGTA GAAGAAAATA ATCTATTAAA ATGGATAATC TTATCAAAAA    14700
GGAAGAACAA CGAATGGTTA CAGCATGAAA TCAAAGAAGG AGAAAGGGAT    14750
TATGGGATAA TGAGGCCATA TCATACAGCA CTGCAAATTT TTGGATTCCA    14800
AATTAACTTA AATCACTTAG CTAAAGAATT TTTATCAACT CCTGATTTAA    14850
CCAACATTAA TAATATAATT CAAAGTTTTA CAAGAACAAT TAAAGATGTT    14900
ATGTTCGAAT GGGTCAATAT CACTCATGAC AATAAAAGAC ATAAATTAGG    14950
AGGAAGATAT AATCTATTCC CGCTTAAAAA TAAGGGGAAG TTAAGATTAC    15000
TATCACGAAG ATTAGTACTA AGCTGGATAT CATTATCTTT ATCAACCAGA    15050
TTACTGACAG GCCGTTTCCC AGATGAAAAA TTTGAAAATA GGGCACAGAC    15100
CGGATATGTA TCATTGGCTG ATACTGATTT AGAATCTTTA AAGTTATTAT    15150
CAAGAAATAT TGTCAAAAGT TACAAAGAAC ACATAGGATT AATATCATAC    15200
TGGTTTTTAA CCAAAGAGGT CAAAATACTA ATGAAACTTA TAGGGGGAGT    15250
CAAACTACTA GGAATTCCCA AACAGTACAA AGAGTTAGAG GATCGATCAT    15300
TTCAGGGTTA TGAATATGAT AATGAATTTG ATATTGATTA ATACATAAAA    15350
ACAAAAAATA AAACACCTAA TCCTCTCCCA TTCACTTCCA ACAAAATGAA    15400
AAGTAAGAAA AACATATAAT ATACATATAC CAAACAGAGT TTTTCTCTTG    15450
TTTGGT                                                   15456
```

FIG. 7G

Figure 8A

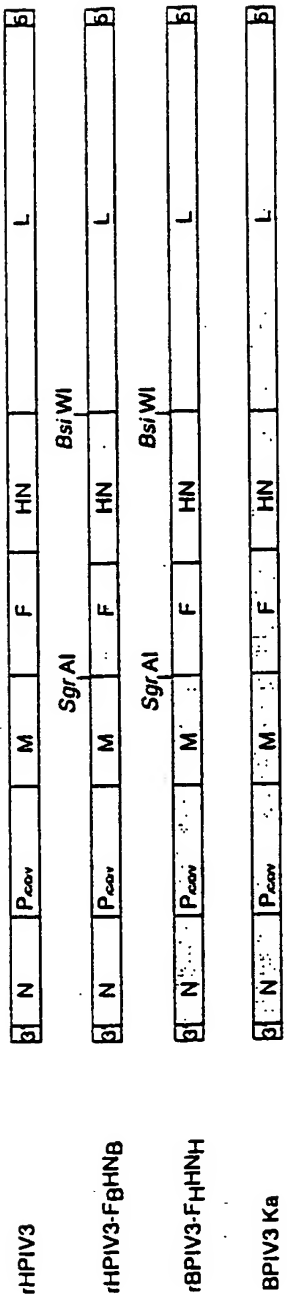

rHPIV3
rHPIV3-FβHNβ
rBPIV3-FHHNH
BPIV3 Ka
N
P
M
F
HN
L
Sgr AI
Bsi WI

Figure 8B

Assembly of an antigenomic cDNA for BPIV3 Ka

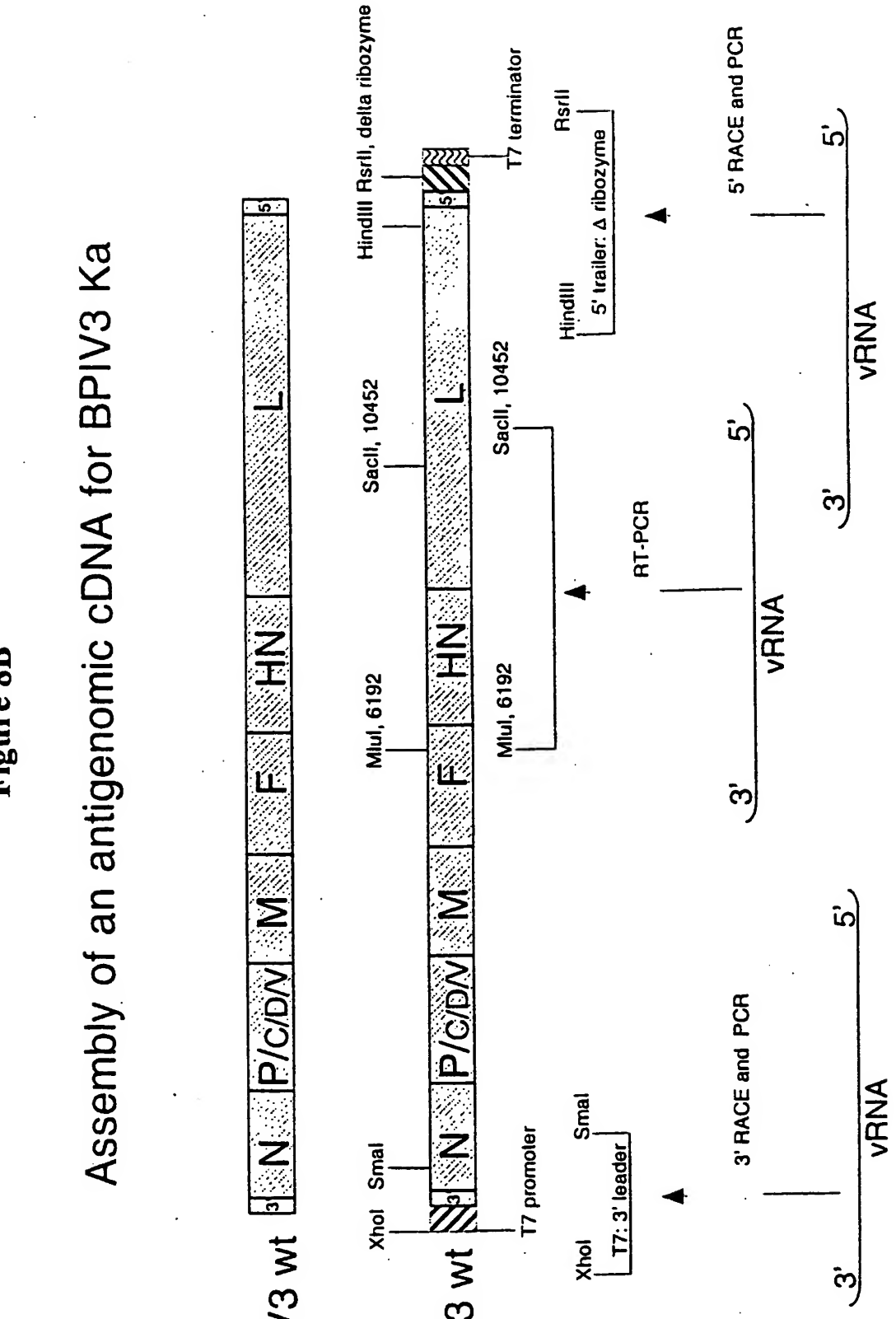
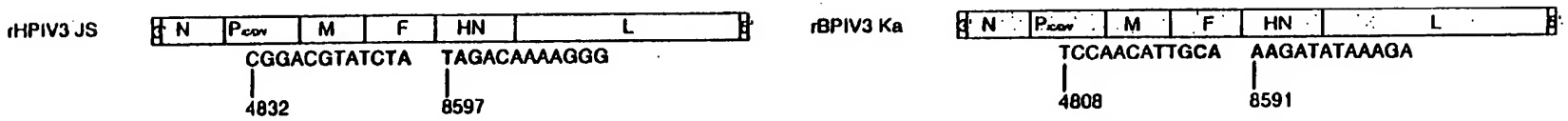


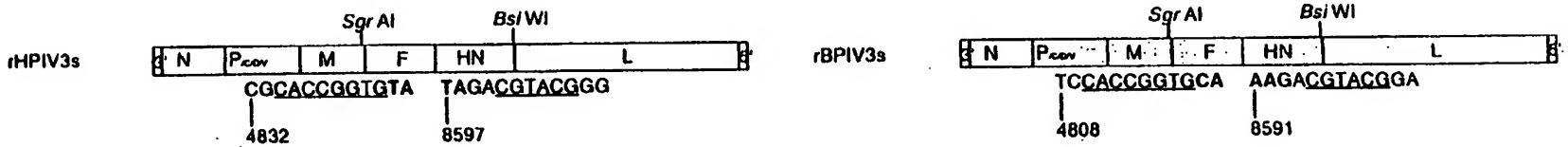
Figure 8C

Generation of full length cDNA clones encoding HPIV3/BPIV3 antigenic chimeric viruses

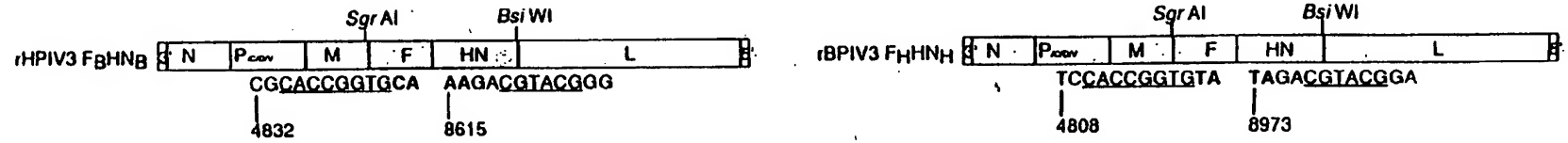
1. Generation of HPIV3 and BPIV3 full length clones



2. Mutagenesis to create uniqueSgrAI and BsiWI restriction sites



3. Cloning of the F and HN genes into the heterologous full length cDNA



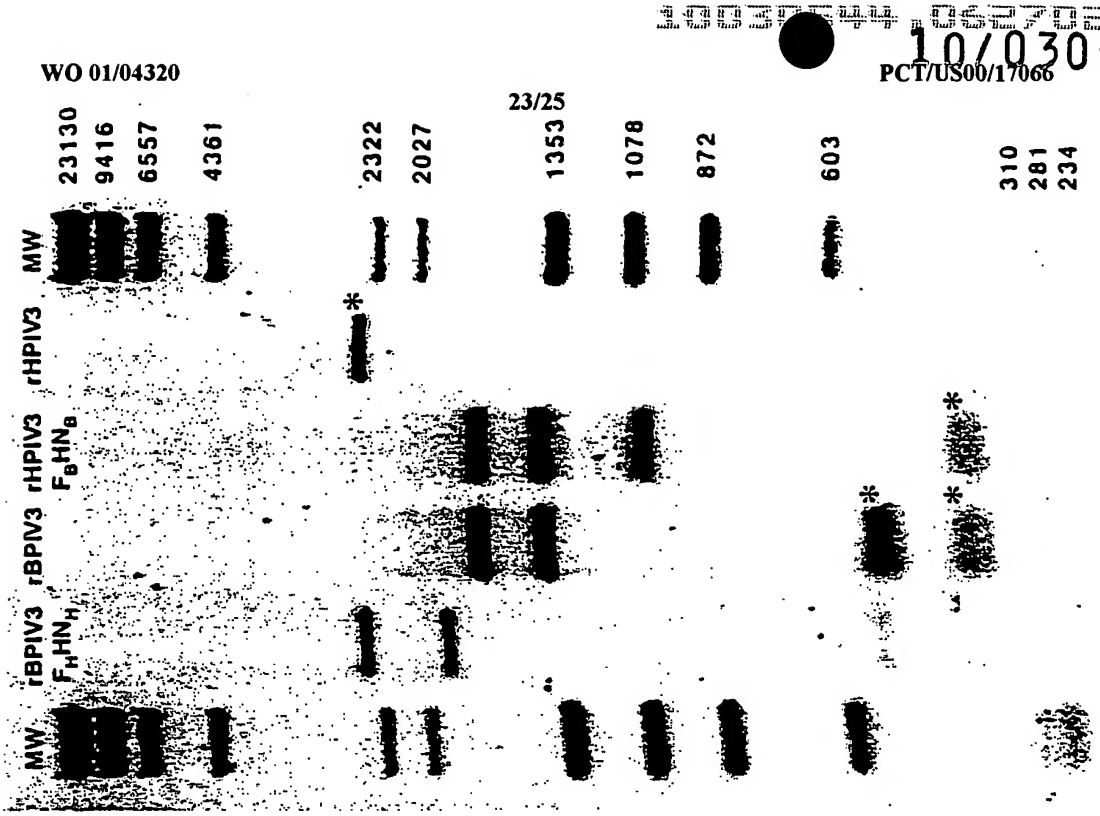
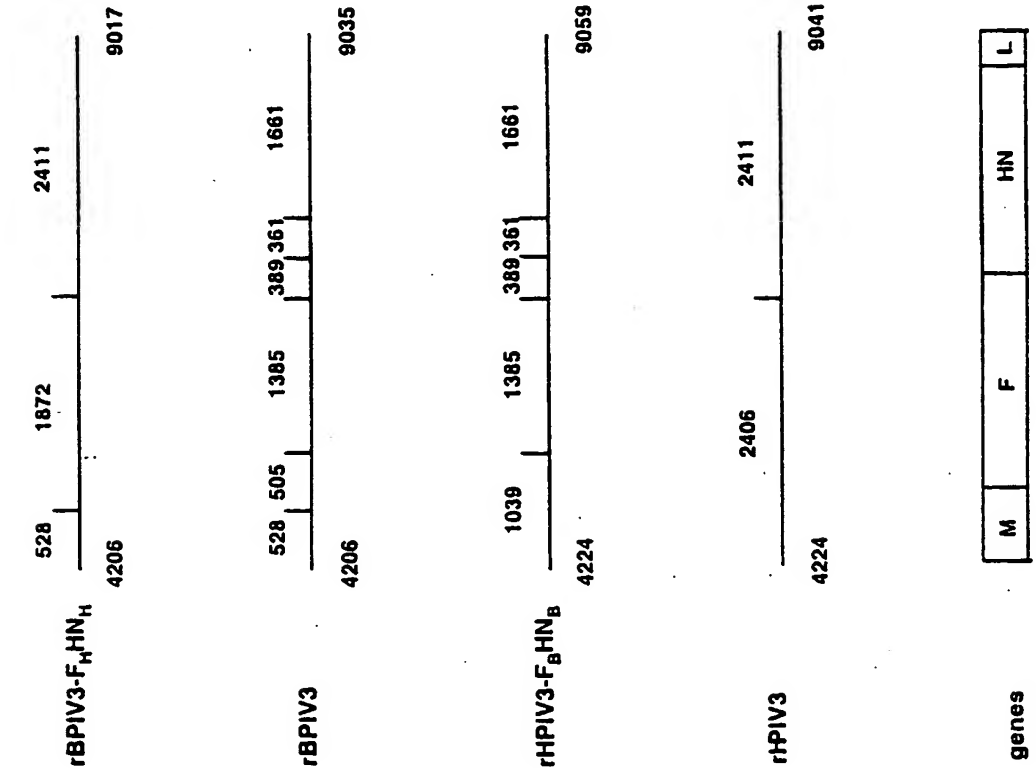

MW
rBPIV3 F$_H$HN$_H$
rBPIV3
rBPIV3 F$_B$HN$_B$
rHPIV3
MW
23130
9416
6557
4361
2322
2027
1353
1078
872
603
310
281
234

Figure 9


rBPIV3-F$_H$HN$_H$
528
1872
2411
9017
4206
rBPIV3
528
505
1385
389
361
1661
9035
4206
rHPIV3-F$_B$HN$_B$
1039
1385
389
361
1661
9059
4224
rHPIV3
2406
2411
9041
4224
genes
M
F
HN
L

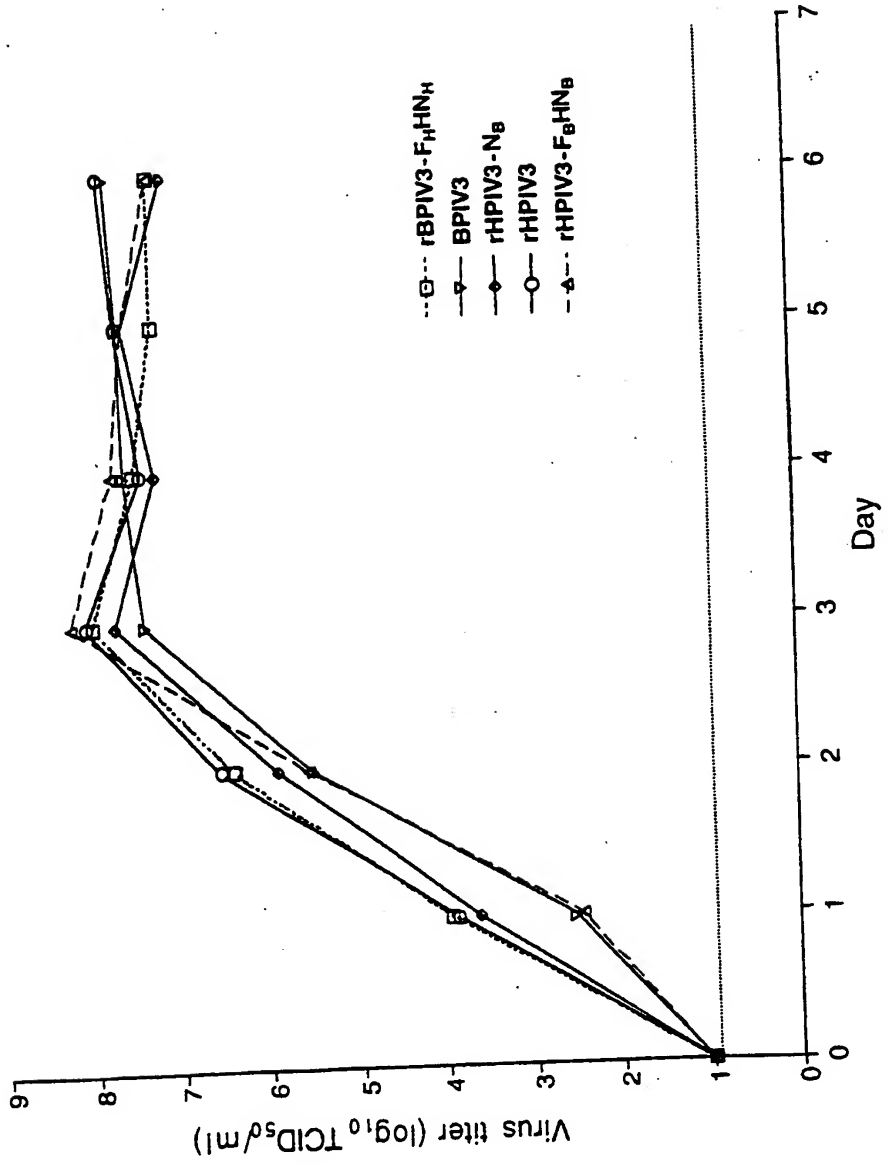

rBPIV3-F$_H$HN$_H$
BPIV3
rHPIV3-N$_B$
rHPIV3
rHPIV3-F$_B$HN$_B$
Virus titer (log$_{10}$ TCID$_{50}$/ml)
Day
0
1
2
3
4
5
6
7
1
2
3
4
5
6
7
8
9

Figure 10

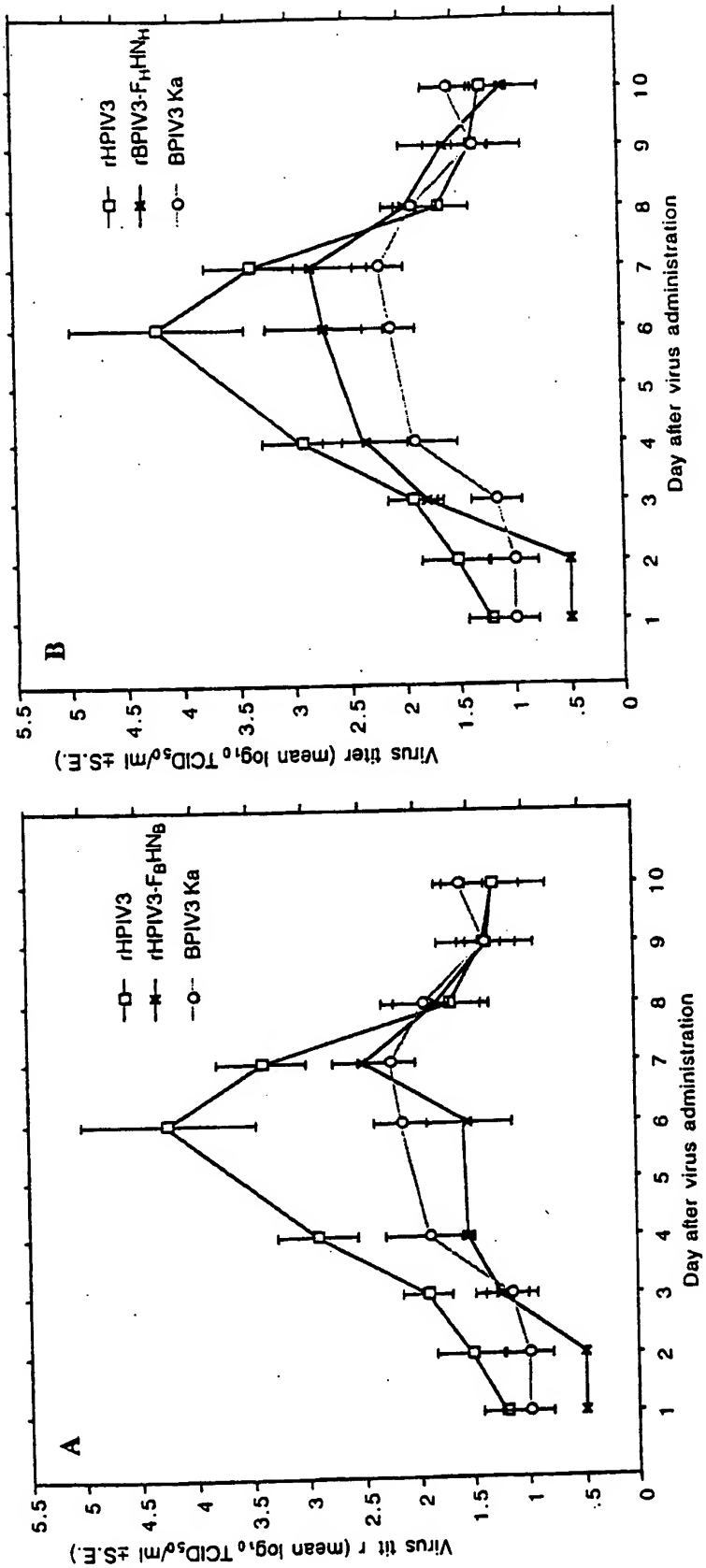

A
B
rHPIV3
rHPIV3-F$_B$HN$_B$
rBPIV3-F$_H$HN$_H$
BPIV3 Ka
Virus titer (mean log$_{10}$ TCID$_{50}$/ml ±S.E.)
Day after virus administration
0
.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
1
2
3
4
5
6
7
8
9
10

Figure 11